

STATE OF VERMONT
PUBLIC SERVICE BOARD

Docket No. 7460

Petition of Vermont Transco LLC, and Vermont Electric)
Power Company, Inc. (collectively, "VELCO"), and)
Green Mountain Power Corporation ("GMP") for a)
Certificate of Public Good, pursuant to 30 V.S.A. § 248,)
for the "Gorge Area Reinforcement Project", located in)
the municipalities of South Burlington and Colchester,)
Vermont, consisting of the following elements: (1))
construction of a new VELCO 115/34.5 kV substation)
("VELCO Lime Kiln substation") and a new GMP 34.5)
kV substation ("GMP Lime Kiln substation") in the City)
of South Burlington across the Winooski River from the)
existing GMP Gorge substation; (2) upgrade of the)
existing GMP Gorge substation in Colchester; and (3))
reconstruct approximately 700 feet of GMP's existing)
3307 and 3308 34.5 kV lines between the GMP Lime)
Kiln and Gorge substations)

Hearing at
Montpelier, Vermont
September 24, 2009

Order entered: 11/23/2009

PRESENT: John P. Bentley, Esq.
Hearing Officer

APPEARANCES: Kimberly K. Hayden, Esq.
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I. INTRODUCTION

In this proceeding, Vermont Electric Power Company, Inc. and Vermont Transco LLC ("VELCO") and Green Mountain Power Corporation ("Green Mountain Power" or "GMP") (VELCO and GMP are also collectively referred to herein as "Petitioners") have filed a petition pursuant to 30 V.S.A. § 248 and Public Service Board ("Board") Rule 5.400, requesting the Board to issue a Certificate of Public Good ("CPG") for the so-called Gorge Area Reinforcement Project (the "GAR" or "Project").

Current transmission system planning studies indicate that for the load levels and load distributions projected for the summers beginning in 2009 and 2010, the Green Mountain Power 34.5 kV system in Chittenden County is expected to be susceptible to poor voltage and thermal performance and two planning criteria violations. The contingencies that are most limiting are (1) loss of either of the VELCO Essex transformers, and (2) an outage of Green Mountain Power's 3307¹ and 3308 34.5 kV lines (which are located on common structures). Up to approximately 4000 customers could be lost following a contingency of the 3307 and 3308 lines. Loss of one of the Essex transformers, which would overload the remaining transformer, would potentially impact a much wider area of Chittenden County.

The level of risk inherent in the existing system is unacceptable and, if left unattended, would preclude Petitioners from providing adequate service, accommodation, and facilities to the public. The GAR Project, which would add another 115 kV source and related infrastructure to

1. This Proposal for Decision contains numerous references to various transmission lines. K-23 and K-25 are VELCO lines operated at 115 kV and run parallel to the Winooski River from the VELCO Essex substation, past the Gorge Dam, to the East Avenue substation in Burlington. As for the GMP lines, all operated at 34.5 kV:

3307	GMP Essex sub to Gorge sub to McNeil sub
3308	GMP Essex sub to Gorge sub (same right-of-way as 3307 to Gorge)
3321	Gorge sub to McNeil sub
3323	McNeil sub to Lake Street sub (next to Moran Plant on Burlington lakefront)
3328	Lake Street sub to GMP Queen City sub
3350, 3351	VELCO Essex sub to GMP Essex sub (across Winooski River and Route 2A)

the area's sub-transmission network, addresses these reliability problems and will also provide necessary reinforcement to the sub-transmission network in this area.

The proposed Project, as conditioned by this Proposal for Decision, will enhance electric reliability for the area and will not result in any undue adverse impacts under any of the substantive criteria of 30 V.S.A. § 248(b). Consequently, I recommend that the Board approve the Project as conditioned below.

II. PROCEDURAL HISTORY

A prehearing conference was held on September 5, 2008. Appearances were entered by Kimberly K. Hayden, Esq., and Sheila Grace, Esq., of Downs Rachlin Martin PLLC for VELCO and Vermont Transco LLC; Benjamin Marks, Esq., of Sheehey, Furlong & Behm P.C. for Green Mountain Power Corporation; William F. Ellis, Esq., of McNeil, Leddy & Sheahan, P.C. for the City of Burlington; James Porter, Esq., for the Vermont Department of Public Service ("DPS" or "Department"); and Judith Dillon, Esq., for the Vermont Agency of Natural Resources ("ANR").

A public hearing was conducted on October 13, 2008, with a site visit following on November 3, 2008.

Petitioners entered into stipulations with both the DPS and the ANR supporting the need for the Project and its satisfaction of the applicable criteria under 30 V.S.A. § 248.

A technical hearing was held on September 24, 2009. All prefiled testimony and exhibits submitted by the parties was admitted without objection.

III. FINDINGS

Based on the evidence of record and the testimony presented at the hearing, I hereby report the following findings to the Board in accordance with 30 V.S.A. § 8.

A. Project Components

1. The proposed Project is comprised of the following principal components:
 - Construction of a new VELCO 115/34.5 kV substation ("VELCO Lime Kiln substation"), which includes a 115 kV three-breaker ring bus and a 115/34.5 kV, 56 MVA transformer, a new Green Mountain Power 34.5 kV five-breaker ring bus

substation (GMP Lime Kiln substation), and an underground line between the two new substations. The VELCO and GMP Lime Kiln substations will be located in South Burlington across the Winooski River from the existing GMP Gorge substation in Colchester;

- A major upgrade of the existing GMP Gorge substation in Colchester. The upgrade will require an expansion of the existing substation fence. The upgrade will provide for:
 - Increased 34.5 kV load and fault current bus capacity required by the proximity of the new VELCO 115/34.5 kV source;
 - Increased 34.5 kV load and fault current bus capacity to accept a potential future upgrade of the existing Gorge peaking generator;
 - A new distribution transformer to allow for the future conversion of the existing 4.16 kV distribution feeders to 12.47 kV, expected to be needed by 2014;
 - A new 34.5 kV distribution feeder position for the Winooski area, which is projected to be needed by 2011; and
- Reconstruction of approximately 700 feet of Green Mountain Power's existing 3307/3308 34.5 kV lines between the GMP Lime Kiln substation and the GMP Gorge substation.

LaForest/Cecchini pf. at 6–7.

2. The upgrades will allow for the removal of approximately 4.2 miles of Green Mountain Power's 3323 and 3328, 34.5 kV lines located between the McNeil Generation Station and the Green Mountain Power Queen City substation located in South Burlington. *Id.* at 7.

3. Although not a principal Project component, on August 12, 2009, Petitioners supplemented their testimony to include the addition of 16 transformer cooling fans to replace the 7 fans currently installed on VELCO's X-10 transformer located at VELCO's Essex substation in Williston. The fans will increase the transformer's current 54 MVA LTE rating to approximately 60 MVA to improve GAR area system reliability. Chase supp. pf. at 2; LaForest supp. pf. at 4.

B. Overview of Need for Project

4. VELCO owns and operates the Vermont bulk electric transmission network (115 kV and above) that integrates the Vermont electrical systems with the northeastern United States transmission system. The VELCO bulk transmission system also serves the electric load of the

local sub-transmission and distribution networks in Vermont, including the 34.5 kV electric system in Chittenden County. LaForest/Cecchini pf. at 3.

5. VELCO also owns, operates, and maintains the transformers and associated facilities that connect the bulk transmission grid with lower voltage sub-transmission and distribution systems. *Id.*

6. The 34.5 kV electric system in Chittenden County (after completion of the Northwest Vermont Reliability Project ("NRP") and the East Avenue Loop Project ("EAL Project")) is largely owned and operated by Green Mountain Power. It surrounds the City of Burlington, providing service to approximately 34,000 Green Mountain Power customers in South Burlington, Williston, Colchester, Winooski, Essex, Richmond, and Bolton, as well as small portions of Huntington, Duxbury, Jericho, and Shelburne. *Id.* at 4.

7. The 34.5 kV system also serves Vermont Electric Cooperative, Inc. ("VEC") and approximately one-third of the City of Burlington Electric Light Department ("BED") electric load. *Id.*

8. The sub-transmission system in Chittenden County is currently fed by three VELCO substations (the Queen City substation in South Burlington, and the Tafts Corners and Essex substations in Williston). *Id.*

9. Upon completion of the EAL Project, the Chittenden County 34.5 kV electric system will also be served by the East Avenue VELCO substation located in Burlington. *Id.*

10. Green Mountain Power currently has fourteen 34.5 kV sub-transmission lines within Chittenden County that total approximately 61 miles (including joint-owned segments), and eleven substations located in the "GAR Area." *Id.*; Cecchini supp. pf. at 2–3; exh. Petitioners TGC-Supp-1.

11. Under Green Mountain Power's planning criteria for its 34.5 kV looped system, if any one transmission element is removed, the system must be able to serve all load without low voltage or thermal overloads of system equipment at peak load levels, with no area generation running. These criteria are violated if a single-outage event causes 34.5 kV voltage to fall below 90% of nominal or if equipment loading exceeds 100% of the summer long-term emergency ("LTE") rating with all load being served. LaForest/Cecchini pf. at 8.

12. Transmission planning studies performed by Petitioners in 2008 revealed that for the load levels and load distributions then projected for 2011, Green Mountain Power's 34.5 kV system in Chittenden County is expected to be susceptible to two violations of the criteria. The contingencies that are most limiting are loss of the VELCO Essex X-20 transformer and an outage of Green Mountain Power's 3307 and 3308 34.5 kV lines. *Id.* at 8–9; exh. Petitioners DLL/TGC-3.

13. Using its positive sequence load flow ("PSLF") software, in conjunction with a contingency processor, VELCO simulated numerous combinations, involving approximately 1000 load-flow base cases and 87 contingencies. LaForest/Cecchini pf. at 8; exh. Petitioners DLL/TGC-3.

14. The results of Petitioners' 2008 analyses demonstrated the need for upgrades at both the GMP Gorge substation and for the proposed new VELCO and GMP Lime Kiln substations by the summer of 2011. *Id.*

15. The thermal deficiencies identified include overload of the VELCO Essex X-10 transformer at 102% of summer LTE, and heavy loading on Green Mountain Power's 3351 line (98% of summer limit) and 3321 line (89% of summer limit). Loss of the 3307 and 3308 lines result in below-criteria voltage, as low as 88% of nominal voltage at the Gorge end of the 3321 line in Colchester. LaForest/Cecchini pf. at 9; exh. Petitioners DLL/TGC-3.

16. Up to approximately 4000 customers could lose power following a contingency of the 3307 and 3308 lines. Loss of one of the Essex transformers, which overloads the remaining transformer, would potentially affect a much wider area in Chittenden County. *Id.*

17. To address the thermal overloads, customer load many times greater than the load directly served by the affected equipment may have to be shed or dropped to reduce the loading on the affected equipment, due to the networked nature of the system. This customer load would have to be left unserved until local area load levels dropped sufficiently to preclude overloading of the identified equipment or until the equipment lost in the outage (i.e., the Essex X-20 transformer) could be returned to service or replaced. LaForest/Cecchini pf. at 9.

18. This restoration or replacement may take days in the case of a 115-to-34.5 kV transformer. *Id.* at 9–10.

19. Following Petitioners' initial filing on July 25, 2008, the Petitioners and representatives of the DPS engaged in a series of discussions regarding the GAR Project load forecast developed by Green Mountain Power. Specifically, the DPS asked Petitioners to review and adjust the forecast as appropriate to account for (1) 2007 and 2008 actual load data, (2) impacts on projected loads that may result from the recent national economic downturn, and (3) normalization for weather effects. The DPS also requested more clarification on the projected savings expected from energy efficiency efforts in the GAR Project area and their impact upon the Project need date. LaForest supp. pf. at 2.

20. Petitioners conducted this and other study work requested by the DPS and filed the results of the additional analyses on July 31, 2009. The results of the updated analyses confirm the Project need at even earlier dates. Specifically, the results show:

- (1) In 2009, the Essex X-10 transformer overloads for loss of the Essex X-20 transformer. The "downstream" GMP 3351 line overloads for the same outage. The loss of the Essex X-10 transformer causes overloads on the GMP 3350 line. These results demonstrate a need for the VELCO and GMP Lime Kiln substations in 2009.
- (2) 2010 is the need year for the rebuild of the GMP Gorge substation to correct unacceptably low post-contingency voltage for loss of the GMP 3307 and 3308 lines on a double circuit tower.
- (3) In 2011, even with the GMP Gorge substation rebuilt, the VELCO and GMP Lime Kiln substations are still needed due to post-contingency overloads on the Essex X-10 transformer for loss of the Essex X-20 transformer, as well as overloads of the "downstream" GMP 3351 line. The loss of the Essex X-10 transformer causes overloads on the GMP 3350 line.
- (4) A recent review of transformer ratings indicates that the Essex X-10 transformer has a 54 MVA LTE rating. This lower rating poses a greater reliability risk than past analyses had indicated for current peak load levels. VELCO needs to improve the cooling on the transformer to increase the current 54 MVA LTE rating to approximately 60 MVA to improve GAR area system reliability.
- (5) The VELCO and GMP Lime Kiln substations remove the local reliability concerns until 2018 when loss of the Essex X-20 transformer overloads the Essex X-10 transformer, assuming the restoration of the unit's LTE rating to 60 MVA. LaForest supp. pf. at 3–4.

C. Project Design

VELCO Essex Substation

21. VELCO proposes to install 16 transformer cooling fans to replace the 7 fans currently installed on VELCO's X-10 transformer. The fans will increase the transformer's current 54 MVA LTE rating to approximately 60 MVA to improve GAR area system reliability. Chase supp. pf. at 2; LaForest supp. pf. at 4; exhs. Petitioners DC-2, 5.

VELCO Lime Kiln Substation

22. VELCO proposes to build the new VELCO Lime Kiln substation on property just to the south of the existing VELCO K-25 line right-of-way on a parcel of land located at the end of Berard Drive in the City of South Burlington, across the Winooski River from the existing Green Mountain Power Gorge substation. Barrett pf. at 3; exhs. Petitioners MB-2 – MB-5.

23. The 115 kV substation will be designed as a four-position ring bus, with two line positions, one transformer position, and one future transformer position. Barrett pf. at 3.

24. The new transformer will be installed on a concrete foundation with integral oil-retention provisions sufficient to contain the total transformer oil volume. The foundation and oil-retention system will be designed in accordance with ANSI/IEEE Standard 980, "IEEE Guide for Containment and Control of Oil Spills in Substations." *Id.* at 5; *see* exh. Petitioners MB-7.

25. This design meets VELCO's current standard practice for environmental protection and VELCO's Spill Prevention Control and Countermeasures Plan, and is in compliance with applicable federal regulations. *See id.* at 5.

26. The 115 kV substation will initially contain three circuit breakers with associated structural steel, disconnect switches, bus work, and auxiliary equipment. Space has been allocated for a future fourth circuit breaker and second power transformer. *Id.*

27. The substation yard will be approximately 260 feet by 150 feet and will be surrounded by a chain-link fence. A new control house will be installed to contain the protection and control equipment for the new substation. *Id.*

28. An area of approximately 90 feet by 120 feet, located adjacent to and south of the proposed VELCO site, will be graded out for a future GMP 12 kV distribution substation. *Id.* at 3–4.

29. The existing K-23 115 kV transmission line (installed as part of the EAL Project) will be looped through the new VELCO Lime Kiln substation. Two new steel H-Frame type structures, each approximately 65 feet in height, will be installed to interrupt the existing line and redirect it into the new substation. *Id.* at 4.

30. VELCO will install its standard lighting plans at this substation. These plans are consistent with the lighting plans approved by the Public Service Board for substation lighting in Docket 6860. Specifically, under normal circumstances, only limited night-time lighting would be on at the substation, at the entrance and at the control building, and along the substation fence. *Id.* at 4–5.

31. The lights will be 70-watt metal halide floodlights or luminaries, pointed downwards. One light by the gate and one light on the control house will be switched by a photo cell. *Id.* at 4–5; exhs. Petitioners MB-3, MB-6.

GMP Lime Kiln Substation

32. The new GMP Lime Kiln 34.5 kV substation will be located adjacent to the planned Gorge VELCO substation, although it will be at a slightly different elevation due to required terracing. Barrett pf. at 6; *see* exhs. MB-2, MB-8 – MB-10.

33. The VELCO and GMP substations will be in two separate yards, with a short (approximately 150 foot) underground 34.5 kV line connecting the two substations. This design was developed to minimize the amount of grading required to accommodate the required equipment. Barrett pf. at 7.

34. The 34.5 kV substation will be designed as a two-bay breaker and one-half bus, with four line positions and two transformer (bus) positions. Barrett pf. at 7.

35. Initially, four line positions and one transformer position will be utilized. The 34.5 kV substation will initially contain five circuit breakers with associated structural steel, disconnect

switches, bus work, and auxiliary equipment. Space has been allocated for one future circuit breaker. *Id.*

36. The substation yard will be approximately 160 feet by 90 feet, and will be surrounded by a chain-link fence. A new control house will be installed to contain the protection and control equipment for the new substation. *Id.*

37. GMP will install lighting similar to VELCO standards at this substation. *Id.*

GMP Gorge Substation Upgrades

38. The existing Gorge Colchester substation is located off of Gorge Road in the Town of Colchester, Vermont, and consists of a wood pole 34.5 kV switching structure with four 34.5 kV lines, one gas turbine generator, and one 34.5/4.16 kV distribution substation. *Id.* at 8; *see* exh. Petitioners MB-2.

39. The GMP Gorge substation will be reconstructed as a six-position 34.5 kV ring bus. Barrett pf. at 8; *see* exh. Petitioners MB-12 – MB-14.

40. The existing 34.5 kV switchyard will be expanded into a six-position ring bus configuration. Two 34.5 kV lines from the proposed Lime Kiln substation will terminate on this ring bus, along with the existing 34.5 kV line to McNeil, the 3321 line, and the gas turbine generator. *Id.*

41. A new distribution bus structure will be developed uphill from the ring bus to provide space for the new 34.5 kV equipment. This structure will be designed for future 12 kV operation; however, it will be operated initially at 4.16 kV. *Id.* at 9.

42. A second 34.5/4.16 kV power transformer will be installed to provide a supply to the two existing 4.16 kV distribution feeders. *Id.*

43. The transformers will be installed on a concrete foundation with integral oil-retention provisions sufficient to contain the total transformer oil volume. The foundation and oil-retention system will be designed in accordance with ANSI/IEEE Standard 980, "IEEE Guide for Containment and Control of Oil Spills in Substations." *Id.* at 11; *see* exh. Petitioners MB-15.

44. The existing control house is large enough to accommodate the additional protection and control equipment. *Id.*

45. The existing fenced yard will be expanded on the northerly and westerly sides by approximately 4500 square feet. The entire substation will be surrounded by a fence similar to the existing decorative fence. *Id.*

46. Because this is an existing, operating substation that serves as a critical point in the 34.5 kV system supplying the northern Burlington area, it is necessary to maintain this facility in service for as much of the time as possible. *Id.* at 10.

47. The proposed equipment layout was designed to facilitate a staged construction sequence. In addition, temporary 34.5 kV bypass lines will be required during construction in order to maintain service. *See id.*

48. GMP will install lighting at this substation similar to that proposed for the GMP Lime Kiln Substation. *Id.*

Reconstructed Green Mountain Power 3307/3308 34.5 kV Lines

49. In order to connect the GMP Gorge and Lime Kiln substations, Petitioners propose to reconstruct and reconductor approximately 700 feet of Green Mountain Power's existing 3307/3308 34.5 kV line between the two substations. Castonguay pf. at 3.

50. Currently, this section consists of two 34.5 kV circuits which run from the Essex GMP substation to the GMP Gorge substation. *Id.*; exh. Petitioners DP-2 (orthophoto contained in report); *see also* exh. Petitioners JC-2.

51. Both circuits currently use 336 ACSR conductor along their entire lengths. The rebuilt section between the GMP Lime Kiln substation and GMP Gorge substation will use 795 ACSR conductor. *Id.*

52. There are currently a total of four poles within the existing 700-foot span. Two poles are 55 feet in total length, or 47.5 feet above ground, and the other two poles are 50 feet in total length, or 43 feet above ground. *Id.*

53. The two existing 55-foot poles will be re-used and the two existing 50-foot poles will be replaced with two 50-foot poles, with the same 43-foot above-ground height. *Id.*

54. In addition to these poles, Petitioners will install four new poles outside the Lime Kiln substation to accommodate the incoming and outgoing lines. Two of these poles will be 50 feet

tall and will be double dead-end buckarm corner poles. The other two poles will be 55-foot full dead-end riser poles for the underground feed into the substation. *Id.* at 3–4; exh. Petitioners JC-3.

Removal of the Green Mountain Power 34.5 kV Burlington Waterfront Lines

55. Green Mountain Power's Burlington waterfront lines are known in GMP's internal documents as the 3323 and 3328 lines. *Id.*

56. The 3323 line runs from the McNeil substation located on Intervale Road in Burlington, to the Moran substation located on the Burlington Waterfront. *Id.* at 4; exh. Petitioners JC-4.

57. The 3323 line is approximately 1.5 miles in length and is supported by 25 wooden structures ranging in height above ground from 29.5 feet to 74.5 feet. Castonguay pf. at 4.

58. The 3328 line runs from the Moran substation to the GMP Queen City substation located in South Burlington. This line is approximately 2.5 miles in length and is supported by 47 wooden structures which range in above-ground height from 29.5 feet to 74.5 feet tall. *Id.*; *see* exh. Petitioners JC-4.

59. The GAR Project will allow GMP to remove the 3323 and 3328 Waterfront Lines. LaForest/Cecchini pf. at 11.

60. Removal of the Burlington Waterfront lines was an objective used in the planning studies for the Burlington Waterfront Area Specific Collaborative ("ASC"). Castonguay pf. at 5; LaForest/Cecchini pf. at 5.

61. There are benefits to the removal of these lines with respect to aesthetics and historic properties. Castonguay pf. at 5; Buscher pf. at 3; Henry/Buscher pf. at 6.

62. BED currently has under-built 13.8 kV distribution circuit(s) located on a majority of the GMP poles along the 3328 line. In these locations, if the BED circuits are not removed by the time the removal work takes place, GMP will remove its circuits and cut the pole tops off to just above the BED circuit, at which point the ownership of the pole will be turned over to BED. If GMP is the sole user of the pole, then the entire pole will be removed and the site restored to blend with the surrounding area. Castonguay pf. at 4–6.

D. Project Cost

63. The estimated total cost of the Project is \$32.7 million. Ostrander/Castonguay pf. at 12; exh. Petitioners GO/JC-9.

64. GMP's estimated costs associated with the 3307/08 line reconductoring between the GMP Lime Kiln and Gorge substations, the new GMP Lime Kiln substation, reconstructed GMP Gorge substation, and removal of the waterfront lines, is \$15.9 million. Ostrander/Castonguay pf. at 4; exh. Petitioners GO/JC-2–4.

65. The VELCO Lime Kiln Substation and Tap Line are estimated to cost approximately \$16.9 million. *Id.* at 7; exh. Petitioners GO/JC-5–7.

66. The cost estimates were developed utilizing five resource categories to establish the total cost for each Project element. The five resource categories are as follows:

- (1) Direct Costs (material, labor, and equipment)
- (2) Indirects;
- (3) Escalation;
- (4) Capital Interest; and
- (5) Contingency.

Id. at 3.

67. Escalation was developed by VELCO Project Controls utilizing an anticipated 2008–2011 spending plan and projected Handy-Whitman cost index. The 2008–2011 VELCO and GMP Spending Plans are based on the need date. *Id.* at 9; exh. Petitioners GO/JC-4 and 7.

68. The Handy-Whitman cost index reflects the costs of different types of utility construction including electric transmission and distribution. The cost index started in 1912 and is a widely recognized publication used by many entities in the utility industry, including regulatory bodies, operating bodies, and valuation engineering. *Id.* at 10.

69. Utilization of the Handy-Whitman index provides a yearly rate of increase for specific cost categories in the utility industry instead of generic inflation rates such as the Consumer Price Index (CPI). *Id.*; exh Petitioners GO/JC-8.

70. Capital Interest (Accumulated Funds Used During Construction or AFUDC) was applied at a yearly compounded rate of 8% for 2008, 7.9% for 2009, and 7.5% for 2010 and 2011. *Id.* at 11.

71. Contingency was calculated at 20% of the total Project estimates, including the Direct and Indirect components, Escalation and Interest. This is in conformance with VELCO project cost estimate methodology based on cost estimating recommended practices from the Association for the Advancement of Cost Engineering International ("AACE") as well as the Project Management Institute. *Id.*

72. Contingency is defined by AACE as:

[a]n amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, and/or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs. Typically estimated using statistical analysis or judgment based on past asset or project experience. Contingency usually excludes: (1) major scope changes such as changes in end product specification, capacities, building sizes, and location of the asset or project; (2) extraordinary events such as major strikes and natural disasters; (3) management reserves; and (4) escalation and currency effects. Some of the items, conditions, or events for which the state, occurrence, and/or effect is uncertain include, but are not limited to, planning and estimating errors and omissions, minor price fluctuations (other than general escalation), design developments and changes within the scope, and variations in market and environmental conditions. Contingency is generally included in most estimates, and is expected to be expended.

Id. at 12.

73. The VELCO Lime Kiln substation facilities costs are considered pool transmission facilities ("PTF"), and as such are eligible for regional cost treatment. The estimated PTF-supported Project cost is \$11.7 million. *Id.* at 14.

E. Project Schedule

74. The estimated VELCO construction schedule is from the last quarter of 2009 into the third quarter of 2010. *See* Ostrander supp. pf. at 2.

75. The estimated GMP construction schedule is from the last quarter of 2009 into the last quarter of 2011. *See* exh. Petitioners GO-JC-3.

76. No significant substation work can proceed until the Lime Kiln site is cleared of trees and leveled. Leveling the site is complicated due to the terrain. Retaining walls must be constructed to allow the site to be backfilled. *Id.*

77. Receipt of a CPG in early October will help provide flexibility to the grading contractor in minimizing the cost impact of 2009–2010 winter construction and help ensure that the substation is commissioned prior to the summer peak of 2011. *Id.*

F. Section 248(b) Findings
Orderly Development of the Region
[30 V.S.A. § 248(b)(1)]

78. The Project will not unduly interfere with the orderly development of the region, with due consideration having been given to the recommendations of the municipal and regional planning commissions, the recommendations of municipal legislative bodies, and the land conservation measures contained in the plan of any affected municipality. This finding is supported by findings 79 through 112, below.

79. The municipalities directly affected by this Project include the City of Burlington, the City of South Burlington, and the Town of Colchester. All three municipalities are members of the Chittenden County Regional Planning Commission. Mallory pf. at 3.

Burlington

80. With respect to the City of Burlington, the Project's impact is limited to removal — upon completion of the Project components — of Green Mountain Power's Waterfront lines between the Queen City and McNeil Substations. Removal of these lines represents an overall improvement. *Id.* at 3; *see also* Castonguay pf. at 4–6; *infra* findings 272 through 316 below.

81. Regarding the siting of electric transmission facilities, the City of Burlington Municipal Development Plan ("CBMDP") emphasizes the importance of retaining "view corridors to Lake Champlain, and the main approaches into the city." *Id.*; *see exh.* Petitioners SM-2 at III-9.

82. The City of Burlington Planning Commission has expressed its support for the removal of the Burlington Waterfront lines. *Id.*

South Burlington

83. In the City of South Burlington, the proposed upgrades include the VELCO and GMP Lime Kiln substations, and the reconductoring of approximately 700 feet of the 3307 and 3308 lines between the GMP Lime Kiln and Gorge substations. *Id.* at 5–6; Castonguay pf. at 2–4; *see* generally Barrett pf.

84. The Lime Kiln substations will be located immediately adjacent to the utility right-of-way at the end of Berard Drive, an industrial/commercially zoned area. Mallory pf. at 6.

85. The reconstruction of the short section of the existing Green Mountain Power 3307 and 3308 lines will result in adding one new pole structure, in approximately the same location as an existing pole structure. *Id.* at 6.

86. As it relates to public utilities, the City of South Burlington's 2001 Comprehensive Plan ("SBCP") states that a goal of the City is "to provide quality public and quasi-public utilities and services to all residents and businesses in a manner that is efficient, cost-effective and environmentally sound." *Id.*; *see* exh. Petitioners SM-3 at 10.

87. Specific to transmission infrastructure, future utility lines, including power as well as phone and cable TV, are encouraged to be undergrounded. The SBCP states specifically that "[f]uture transmission lines should be confined to existing utility corridors and placed underground if possible." Mallory pf. at 6–7; *see* exh. Petitioners SM-3 at 143–144.

88. The Petitioners' 45-Day Notice was mailed to the City of South Burlington City Council and its Planning Commission on May 16, 2008. Mallory pf. at 7.

89. The Petitioners have subsequently contacted staff from the City Manager's office regarding questions or requests for presentations and have not received any comments or questions. *Id.*

90. VELCO has given due consideration to the conservation measures identified in the SBCP; the Petitioners have designed the Project to optimize the use of the existing utility corridor in South Burlington and to minimize the impacts associated with the redesigned utility infrastructure. *Id.*

91. The need for the Project is consistent with South Burlington's goals to allow for the City's continued growth as an urban center and to provide quality utilities and services to all residences and businesses. *Id.*

Colchester

92. In the Town of Colchester, the proposed upgrades are limited to reconstructing short sections of the existing Green Mountain Power 3307 and 3308 lines on the two pole structures that enter from South Burlington via the Winooski River crossing, and a reconstruction of the existing Gorge GMP substation. Mallory pf. at 8.

93. The substation reconstruction will expand the substation yard to replace antiquated equipment and allow for increased capacity. *Id.*; *see generally* Barrett pf.

94. With respect to the siting of electric transmission facilities, the 2007 Comprehensive Town Plan ("CTP") for the Town of Colchester states that the Town "shall work to ensure that adequate, safe, and affordable energy systems and services are available to all residents and businesses and encourage the efficient use of energy." Mallory pf. at 8; exh. Petitioners SM-4 at 75.

95. Additionally, the CTP states that one of the Town's policies is that:

[u]tility infrastructure should be upgraded and expanded as necessary; however, care shall be taken to appropriately site and screen this infrastructure. Wherever possible, new or relocated electric cables, communication cables, transmission lines, switches and similar equipment shall be located underground.

Mallory pf. at 8–9; exh. Petitioners SM-4 at 78-79.

96. Several areas are identified within the Town to have specific land-use policies. The Project, because of its location in the Fort Ethan Allen area, which is currently zoned as a village mixed-use / general-development area, does not impact any of the town-specific policies.

Mallory pf. at 9; exh. Petitioners SM-4 at 7-33.

97. Although the plan notes setback requirements for parcels along the Winooski River, the proposed expansion of the GMP Gorge substation will not disturb the existing buffer between the substation and the Winooski River. Mallory pf. at 9; *see* exh. Petitioners SM-4 at 42.

98. The Petitioners' 45-Day Notice was mailed to the Town of Colchester Selectboard and the Town of Colchester Planning Commission on May 16, 2008. Mallory pf. at 9.

99. The Petitioners subsequently contacted both the Selectboard and the Planning Commission regarding questions or requests for presentations and have not received any comments or questions. *Id.*

100. Petitioners' representative made a presentation on the project to the Colchester Select Board on June 10, 2008, with no negative concerns being raised. *Id.*

101. The Petitioners have given due consideration to the recommendations identified in the CTP. The Project is needed and has been designed to provide adequate and reliable service to the electric customers in Chittenden County, including Colchester. *Id.* at 9–10; *see also supra* findings 8 through 16.

Chittenden County Regional Planning Commission

102. The Chittenden County Regional Planning Commission ("CCRPC") adopted the Chittenden County Regional Plan on August 28, 2006 ("CCRP"). Mallory pf. at 10; exh. Petitioners SM-5.

103. Regarding the siting of electric transmission facilities, the CCRP states as a policy objective that energy production, transmission, and distribution infrastructure in Chittenden County should be efficient, reliable, cost-effective, and environmentally responsible. Mallory pf. at 10.

104. Further, the CCRP states as a policy that a larger share of the county's energy needs should be supplied by a combination of responsible new generation in the county, maintenance of renewable power sources (such as hydroelectric power), improved transmission, and gains made through increased efficiency and conservation. *Id.*; exh. Petitioners SM-5 at 10.14.

105. In terms of stimulating economic development, the CCRP makes a general statement that the "[s]tate and municipalities should support infrastructure investment to foster economic development in areas planned for development." Mallory pf. at 10–11; exh. Petitioners SM-5 at 6.13.

106. To this goal, transmission expansion and upgrades would provide infrastructure relevant to economic development. Mallory pf. at 11.

107. The Infrastructure section of the CCRP states as a general principle that:

[I]nfrastructure systems may be made more dependable, safe, and/or cost-efficient by increasing the size or efficiency of the system. Infrastructure systems that serve as networks (e.g., telecommunications or transportation) are more valuable when the network is expanded to serve more people or a larger territory. To achieve these economies of scale or performance improvements, some infrastructure systems are expanded so that they cross municipal boundaries. These expansions may be accomplished in different ways: A for-profit or a nonprofit private enterprise may be authorized as a utility to provide these services — or one key part of the infrastructure system — in a prescribed area (e.g., VELCO, Vermont Gas Systems, and telecommunications providers).

Id.; exh. Petitioners SM-5 at 8.2.

108. In terms of archeology impacts associated with construction projects, the CCRP recognizes that:

some historic resources are recognized and well interpreted, while others are less visible or even kept secret for their protection (particularly archeological resources such as burial sites). Resources can be significant to local, Vermont, or the national history.

Mallory pf. at 11; exh. Petitioners SM-5 at 3.4.

109. The CCRP references the Vermont Historic Preservation Act for the protection of archeological resources, to which transmission-siting projects are subject within the State. Mallory pf. at 11; *see* exh. Petitioners SM-5 at 3.5.

110. The Petitioners' 45-Day Notice was mailed to the Chittenden County Regional Planning Commission on May 16, 2008. Mallory pf. at 12.

111. The Petitioners subsequently contacted planning commission staff regarding questions or requests for presentations and have not received any comments or questions. *Id.*

112. The Petitioners have given due consideration to the recommendations identified in the CCRP. Consistent with the CCRP, the Project is designed to improve the electric transmission system, making the electric infrastructure system more dependable. *Id.*

**Need for Present and Future Demand for Services
[30 V.S.A. § 248(b)(2)]**

113. The Project is required to meet the present and future demand for services which could not otherwise be provided in a more cost-effective manner through energy conservation programs and measures and energy efficiency and load management measures. This finding is supported by findings 114 through 170, below.

114. The present electric sub-transmission and distribution network in the GAR Area cannot provide adequate and reliable electric service to the customers served in that area. Findings 8 through 16, above.

115. Petitioners' original load forecast used for the July 25, 2008, filing in this docket was developed by GMP as the regular update for the VELCO Positive Sequence Load Flow transmission system model database. The historic substation loads were input into the Excel FORECAST function, which predicts future loads by developing a best-fit straight line using the least-squares method of linear regression. LaForest/Cecchini pf. at 12; Cecchini supp. pf. at 4–5; exh. Petitioners DLL/TGC-4.

Updated Planning Studies

116. Pursuant to the DPS request, the Petitioners hired Itron, Inc., to prepare a weather-normalized and economically adjusted forecast for the GAR Area. The Itron forecast was updated in April, 2009, to reflect the most current economic data from Economy.com and its impact upon the GMP GAR Area load. Exhibit Petitioners DLL-Supp-3 at 1.

117. The Itron forecast reflects a peak load of 112.68 MW in 2011. This load was adjusted to 111.3 MW to take into account impacts of energy efficiency programs. Cecchini supp. pf. at 5.

118. The results of the recently completed updated planning studies performed by Petitioners since the July 25, 2008, filing in this matter, confirm the Project need at an even earlier date than originally calculated. Refer to Finding 17, above; LaForest supp. pf. at 3–4; exh. Petitioners DLL-Supp-3; exh. Petitioners DLL-Supp-1.

119. The updated analyses demonstrate a definitive Project need for the Lime Kiln substations in the year 2009 with or without the GMP Gorge substation rebuilt, and a 2010 need

date for the GMP Gorge substation upgrade. LaForest supp. pf. at 4–5, 8–9; exh. Petitioners DLL-Supp-1; exh. Petitioners DLL-Supp-3.

120. Specifically, the Lime Kiln Project need in 2009 is driven by the X-10 transformer loading; for all sets of conditions examined with 2009 forecast load, the Essex X-10 is overloaded without or with the GMP Gorge substation. LaForest supp. pf. at 13; exh. Petitioners DLL-Supp-1, Tables 1-3; exh. Petitioners DLL-Supp-3.

121. VELCO also examined the potential to address the overloads on the Essex X-10 transformer by replacing it with a higher rated, VELCO-owned 115-to-34.5 kV transformer. VELCO has nine 115-to-34.5 kV transformers with a nameplate rating of 50 or 56 MVA including the Essex X-10 and X-20 transformers. LaForest supp. pf. at 13.

122. The highest rated transformer (Middlesex, 65 MVA) was examined as a possible replacement for the Essex X-10 transformer (54 MVA). The Middlesex transformer would suffer the overloads in 2011 without the use of the Essex diesels, the most effective mitigating measure. The Essex X-20 transformer will be loaded to just below its LTE rating (66 MVA) in 2011 and will be overloaded with additional local load in succeeding years. *Id.* at 14.

123. Swapping the Essex X-10 transformer with an existing transformer incurs added expense for the move (equipment and labor costs for each move), adds reliability risk (due to potential damage to the transformer during the move or outages necessary to take the transformers out of service for the move) and more expense to accommodate a new transformer at the Essex X-10 location (the site is constrained and would require civil and construction costs to move 34.5 kV buswork and equipment to accept other VELCO 115-to-34.5 kV transformers). *Id.*

124. The need for the GMP Gorge substation upgrades in 2010 is driven by the unacceptable low voltage (below 90% of nominal) on the GMP system for loss of the GMP 3307 and 3308 lines in 2010. These lines are on a double-circuit tower and can be lost in a single event or contingency. *Id.* at 4.

125. The low voltage can be remedied by rebuilding the GMP Gorge substation into a ring bus; this substation configuration would strengthen the area and improve the system's voltage performance for this outage. *Id.* at 4–5.

126. If the GMP Gorge substation can be rebuilt by 2010, the need for the Lime Kiln substations still exists in 2010 if one of the load-reduction measures (the Essex diesel units, the Burlington gas turbine, or the GAR-area demand response program) is unavailable. If the GMP Gorge substation can be rebuilt by 2011 and all three of the load-reduction measures (the Essex diesels, the Burlington gas turbine, or the GAR-area demand response program) are available to reduce flow, the Lime Kiln substations are still needed in 2011. *Id.* at 3 n.2.

127. Based on current information the earliest any substation could be complete, if approved, is 2011. *Id.*

Energy Efficiency

128. Savings from energy efficiency will not defer or eliminate the need for the transmission upgrades that are proposed as part of the Project. *See* findings 129 through 135, below.

129. Although the load forecast did not change significantly in the updated load forecast, which was developed for GMP by ITRON, the expected energy efficiency savings in the GAR Area did drop significantly, due in large part to a significant drop in projected efficiency savings as reported by Efficiency Vermont ("EVT"). *See* Cecchini supp. pf. at 6–7; Grimason supp. pf. at 2–3.

130. The 2011 GAR Area forecasted peak load used for the 7/25/08 filing was 111.60 MW, while the revised GAR Area forecasted load in 2011 is 112.68 MW. Cecchini supp. pf. at 5–7.

131. The cumulative reduction in load from energy efficiency savings in the GAR Area was originally calculated to be 10.3 MW. The savings estimate was reduced to 2.9 MW in the updated analysis. Grimason supp. pf. at 3.

132. EVT's recently released total savings estimate for the years 2009 through 2011 is 2.8 MW, which is considerably less than the 6.9 MW assumed in the original analysis. Grimason supp. pf. at 3.

133. There are three major factors that contribute to the lower savings estimates: (1) updating to use EVT's own estimates of savings for 2009 through 2011 rather than extrapolating based upon older projections; (2) use of a 30% discount for uncertainty factors; and

(3) use of actual savings for 2007 and 2008 as opposed to previous (higher) projections for those periods. *Id.* at 2.

134. These changes result in a cumulative reduction to the 2011 pre-energy efficiency load of only 2.9 MW as compared to 10.3 MW in the original July 2008 analysis. *Id.* at 2–3.

135. In the original analysis filed with the Board, the effects of energy efficiency were not discounted. In fact, some discount may be appropriate, but the project is needed soon regardless of whether electrical efficiency savings are discounted. *See id.* at 4–6.

Demand Response

136. "Demand response" refers to arrangements under which retail electricity customers temporarily reduce their electricity usage from GMP's system upon request from GMP or the ISO-New England, Inc. ("ISO-NE"). Such reductions may be supported by a combination of on-site customer generation or changes in customers' actual consumption (e.g., turning off certain end uses or deferring operations to off-peak hours). Smith supp. pf. at 2.

137. Some GMP customers presently participate in one of the ISO-NE Demand Response Programs, curtailing consumption when instructed by ISO-NE. *Id.*

138. To the extent that customers in the appropriate geographic area can reduce their consumption when requested during key summer hours, demand response has the potential to address reliability needs in the GAR Area. However, in order for demand response to serve as a reliability resource in the GAR Area, it would need to be reliably called upon during GMP-specific events — not only when ISO-NE calls for reductions under its program based on regional loads and conditions. *Id.* at 3.

139. In addition, to help address the reliability needs of the GAR Area, demand response needs to be located in the GAR Area. The vast majority of the area and associated electrical load are in the towns of Colchester, Winooski, and Essex; small amounts of load in South Burlington and Williston are also included. Smith supp. pf. at 3.

140. The location of demand response resources within the GAR Area is also relevant; curtailing demand in one location will not necessarily have the same system reliability benefit (e.g., unloading a key facility) as in another location. *Id.*

141. GMP provided VELCO with estimates on the magnitude and location of where the demand response resources would likely be within the GAR Area based on customer information; the results reveal an estimated distribution of load reductions by circuit that total 3 MW by 2011. *Id.* at 4.

142. Unless and until customers enroll in a GAR-specific program, the precise location and magnitude of demand response resources within the area cannot be known. *Id.*

143. In order to obtain 3 MW of reliable peak reduction, GMP would likely need to obtain customer agreements to curtail a greater amount of customer load. *Id.*

144. Based upon the information available at this time, it would be overly optimistic to assume that a greater amount than 3 MW of demand response will be achieved in the GAR Area. *Id.*

145. The 3 MW of assumed demand response in the GAR Area does not defer the Projected need date for the Project. *Id.* at 6–7.

Transmission Alternatives

146. There are no cost-effective or feasible transmission alternatives ("TAs") to the Project. *See* findings 147 through 162, below.

147. Several TAs were evaluated as part of the Project. These include the following:

- Airport Parkway 115/34.5 kV Substation;
- Malletts Bay 115/34.5 kV Substation; and
- Upgrades to Essex Substation and 3307/3308 lines.

Barrett pf. at 12.

148. The Gorge GMP substation is common to (i.e., a necessary element required in addition to) all three TAs. Ostrander/Castonguay pf. at 14; LaForest/Cecchini pf. at 16.

149. The Airport Parkway substation alternative, which would have been located adjacent to the VELCO and GMP transmission right-of-way on the west side of Airport Parkway, is essentially the same design as the Lime Kiln substation, but in a different location. Barrett pf. at 12–13; LaForest/Cecchini pf. at 17; exh. Petitioners DLL/TGC-5.

150. This alternative is estimated to cost about \$1.6 million more than the Project. LaForest/Cecchini pf. at 17; exh. Petitioners GO/JC-10.

151. The Airport Parkway substation was not preferred primarily due to its location in a densely populated area and visual impacts, as well as cost. LaForest/Cecchini pf. at 17.

152. The Malletts Bay substation TA would have involved a new VELCO 115/34.5 kV substation in the Malletts Bay area of Colchester located along the VELCO 115 kV right of way east of the I-89 crossing in northern Colchester. LaForest/Cecchini pf. at 18; Barrett pf. at 14; exh. Petitioners DLL/TGC-6.

153. The Malletts Bay substation TA also would have required a new, approximately 1.5-mile 34.5 kV transmission line (approximately 1 mile of which would be new corridor) located between the new substation and the existing 34.5 kV line infrastructure, and a new Green Mountain Power Malletts Bay substation. LaForest/Cecchini pf. at 18; exh. Petitioners DLL/TGC-6.

154. Based upon the conceptual estimates developed, the Mallets Bay substation TA would be approximately equal to the proposed VELCO Lime Kiln 115 kV substation in complexity, but is estimated to cost about \$4 million more than the proposed Project. LaForest/Cecchini pf. at 18; *see* exh. Petitioners GO/JC-10.

155. The proposed VELCO Lime Kiln substation has the additional advantage of being sited partially on land currently owned by Green Mountain Power. LaForest/Cecchini pf. at 18.

156. In addition, the 700-foot corridor between the new GAR Project facilities and the interface with the existing 34.5 kV system already exists, whereas the Mallets Bay substation TA requires approximately one mile of new corridor. *Id.*

157. The Essex substation upgrades TA would involve upgrades to VELCO's Essex substation located in Williston, GMP's Essex substation located in Essex, the two 1000-foot 34.5 kV overhead lines between them, and the reconstruction of approximately 3.2 miles of the 34.5 kV line between GMP's Essex substation and GMP's Gorge substation. LaForest/Cecchini pf. at 17.

158. If the Essex substation upgrades were constructed instead of the Project, the 3.2-mile Essex-to-Gorge line segment would become a sunk cost when the Project is ultimately constructed. *Id.*

159. In addition, the Essex upgrades pose significant construction feasibility challenges without the Project in service, as they would require extensive outages and removal of much of the existing substation equipment. LaForest/Cecchini pf. at 17; Barrett pf. at 14.

160. Due to the inability to construct the GMP Essex portion of the Project at this time, a cost estimate was not developed for this TA. LaForest/Cecchini pf. at 18; Barrett pf. at 14.

161. VELCO also examined a potential deferral strategy of replacing the Essex X-10 transformer with a higher rated, VELCO-owned 115-to-34.5 kV transformer. LaForest supp. pf. at 13.

162. As previously noted, however, swapping the Essex X-10 transformer with an existing transformer incurs added expense for the move, adds reliability risk (due to potential damage to the transformer during the move or outages necessary to take the transformers out of service for the move), and more expense to accommodate a new transformer at the Essex X-10 location. *Id.* at 14.

Generation

163. Generation cannot avoid or defer the need for the Project. Findings 164 through 170, below.

164. A completed ISO-NE System Impact Study indicates that 40 MW of new generating capacity at the GMP Gorge site could, from an electrical perspective, effectively defer VELCO's 115-kV Lime Kiln substation upgrade through 2018. Smith supp. pf. at 12.

165. However, generation is not the most cost-effective reliability solution for the Gorge area. This is primarily because a generation project would be capital-intensive, and recent analysis indicates that prices in the ISO-NE Forward Capacity Market ("FCM") will remain — at least for the near-term and potentially longer — well below the levels required to support new generating capacity such as that considered for Gorge. *Id.*

166. While installing significant Gorge generation in the near term could represent a capacity hedge for GMP customers, it would also largely or entirely consume the flexibility inherent in the site. Specifically, constructing generation now would essentially be a commitment for the economic life of the project, regardless of future market price outcomes. *Id.* at 23.

167. In contrast, constructing the GAR project as the near-term reliability solution would give GMP maximum flexibility to choose when to pursue additional capacity at the site (e.g., deploy sooner if capacity prices increase significantly, defer or build less capacity if prices remain low), and which equipment to use. *Id.* at 12–13, 23.

168. This flexibility is likely to provide significant value to ratepayers. *Id.* at 12–13.

169. The generation option is estimated to require somewhat higher near-term retail rates for GMP customers — about one percent higher than for the GAR project. *Id.* at 23.

170. GMP considers the outlook for obtaining required permits — including a Certificate of Public Good — to be less certain for a Gorge generation option than for the GAR transmission project, as it would involve a substantial facility (the 40 MW option would be one of the largest generating plants in Vermont) in an urban area. *Id.*

Discussion

When considering electric transmission system upgrades, this Board has observed that it has an obligation to ensure that Vermont's electricity customers receive "adequate service." While the legislature did not define "adequate," . . . it is clear that adequacy of electric service is a relative and dynamic standard, such that a level of service that may have been "adequate" in years past might no longer meet that standard today, given the pervasiveness of modern technology in the home and workplace for which electricity is essential.

In re: Northwest Vt. Reliability Project, Docket No. 6860, Order of 1/28/05 at 9 (citing 30 V.S.A. § 219). As this Board concluded in its Order approving the Northwest Vermont Reliability Project:

Operating and maintaining a reliable electric transmission infrastructure and power supply delivery system is vital to Vermont's economy and a 21st century society:

Modern society has come to depend on reliable electricity as an essential resource for national security; health and welfare; communications;

finance; transportation; food and water supply; heating, cooling and lighting; computers and electronics; commercial enterprise; and even entertainment and leisure — in short, nearly all aspects of modern life

Id. at 18 (citing U.S.-Canada Power System Outage Task Force, *Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendation* 5 (Apr. 2004)).

The evidence in this case clearly demonstrates that this Project is needed to provide reliable and adequate service to the customers of the State of Vermont. The evidence also demonstrates that energy efficiency, demand response, and generation are neither cost-effective nor reliable solutions to avoid or defer the need for this project. Similarly, the transmission alternatives evaluated were either not feasible from a reliability perspective, or were significantly more expensive and raised problematic siting concerns.

I conclude, based upon the evidence presented, that this Project is required to meet a need for present and future demand for service that could not otherwise be provided in a more cost-effective manner through energy conservation programs and measures and energy efficiency and load management measures.

System Stability and Reliability **[30 V.S.A. § 248(b)(3)]**

171. The Project will not adversely affect system stability and reliability; in fact, the Project will enhance system stability and reliability. This finding is supported by findings 114 through 170, above, and findings 172 and 173, below.

172. The Project will reduce or eliminate local sub-transmission overloads and low voltage in the GAR Area. LaForest supp pf. at 3–7.

173. Studies that have been performed by VELCO, as well as ISO-NE's review, have concluded that the proposed Project will not have a significant adverse effect on the stability, reliability, or operating characteristics of the VELCO transmission facilities, the transmission facilities of another transmission owner, or the system of a market participant. *See* exh. Petitioners DLL-Supp-2.

Economic Benefit to the State
[30 V.S.A. § 248(b)(4)]

174. The Project will result in economic and social benefits to the state of Vermont and its residents. This finding is supported by findings 175 through 177, below.

175. The Project will improve the reliability of the electric transmission system serving the GAR Area, and all of Chittenden County, by removing critical loads from single-contingency exposure. Findings 8 through 16, above.

176. Improved reliability in the electric transmission system serving Chittenden County is important to attracting and retaining businesses and supporting a healthy business climate in Vermont. *In re: Northwest Vt. Reliability Project*, Docket No. 6860, Order of 1/28/05 at finding 558.

177. A more reliable transmission network enhances efforts to promote economic development and create jobs in Vermont. *Id.* at finding 559.

Aesthetics, Historic Sites and Water Purity, the Natural Environment and Public Health and Safety
[30 V.S.A. § 248(b)(5)]

178. The Project will not have an undue adverse effect on aesthetics, historic sites and water purity, the natural environment, and the public health and safety. This finding is supported by findings 179 through 363, below, which give due consideration to the criteria specified in 10 V.S.A. §§ 1424a(d) and 6086(a)(1) through (8) and (9)(K).

Outstanding Resource Waters
[10 V.S.A. § 1424a(d) and 30 V.S.A. § 248(b)(8)]

179. No element of the Project is located within the vicinity of the water bodies designated by the Vermont Water Resources Board as Outstanding Resource Waters, and therefore the Project will not have any effect on Outstanding Resource Waters. Exhibit Petitioners DJP-2 at 15–16.

Air Pollution**[10 V.S.A. § 6086(a)(1)]**

180. The Project will not cause undue air pollution. This finding is supported by findings 181 through 203, below.

181. During construction, there will be temporary but limited impacts from operation of construction equipment (e.g., diesel- and gasoline-powered trucks and equipment). Stamatov/Castonguay pf. at 3.

182. Minimal tree clearing will be required for this Project, but when clearing is required, trees and brush will be chipped, not burned. *Id.*

183. When necessary, dust will be controlled through application of water or calcium chloride on construction access roads and other areas disturbed by construction. *Id.* at 3–4.

184. The Project itself will not produce air emissions. *Id.* at 3.

Noise

185. The proposed Project will not produce undue noise levels. This finding is supported by findings 186 through 203, below.

186. There are no federal or state noise standards that apply to the Project. The applicable statutory standard under the Section 248 criterion is that the project not have an undue adverse effect. Therefore, to consider the reasonableness of noise levels, Petitioners' expert applied guidelines used elsewhere. Kaliski pf. at 4.

187. The World Health Organization's "Guidelines for Community Noise" suggests noise criteria based on the most recent scientific research on noise effects. The Guidelines, published in 1999, recommend a limit of 50 dBA, averaged over the day, to protect against moderate annoyance, and 45 dBA, averaged over the night, to protect against sleep disturbance. *Id.* at 4; *see also In re: East Avenue Loop Project*, Docket 7314, Order of 5/29/08 at 44; *In re: Northwest Vt. Reliability Project*, Docket No. 6860, Order of 1/28/05 at 143.

188. The U.S. Environmental Protection Agency has also established Protective Noise Level Guidelines, which are not intended to be applied as standards. For most residential areas, the

protective Level is 55 dBA Ldn². Kaliski pf. at 4; *see also In re: East Avenue Loop Project*, Docket 7314, Order of 5/29/08 at 44; *In re: Northwest Vt. Reliability Project*, Docket No. 6860, Order of 1/28/05 at f. 412.

189. In its decision in *Re: Hannaford Brothers Co. and Southland Enterprises, Inc.*, #4C0238-5-EB, Findings of Fact, Conclusions of Law & Order (altered), (Nov. 27, 2002), the Environmental Board imposed noise limits of 60 dBA during the day and 50 dBA during the night for residences along US Route 7 (in South Burlington), and 55 dBA during the day and 45 dBA during the night for residences of the quieter Queen City neighborhood behind the proposed store that was the subject of the proceeding. Kaliski pf. at 4–5.

190. There are no quantitative noise standards in Colchester. *Id.* at 5.

191. South Burlington has a Land Development Regulation that limits noise to 45 dBA at night "at any property line that adjoins a residential property" and 60 dBA at night "at any point where the property on which the noise emanates adjoins any property used for commercial purposes." *Id.*

192. In addition, the National Electrical Manufacturer's Association ("NEMA") publishes standards for noise emissions from new power transformers. These are codified in "NEMA Standards Publication No. TR-1-1993 (R2000), Transformers, Regulators, and Reactors." The standards give maximum noise levels at a distance of 1 to 6 feet from a transformer under various cooling modes by transformer size. *Id.*

193. Sound monitoring conducted at the existing GMP Gorge substation included measuring sound levels around the fenceline and at each of the two existing transformers, and collecting sound levels over 8 days at three locations outside of the fenceline. *Id.* at 6.

194. Background sounds in this area generally remained above 40 dBA and higher due primarily to the combination of water noise at the Gorge, a natural-gas valve adjacent to the substation, aircraft operations, and traffic noise from I-89 and Vermont Route 15. *Id.*

2. The abbreviation "dBA" refers to decibels weighted accorded to the so-called "A" scale to account for human perceptions of noise frequencies. The abbreviation "Ldn" refers to a day-night sound level where nighttime sounds are weighted by + 10 decibels. *In re: Northwest Vt. Reliability Project*, Docket No. 6860, Order of 1/28/05 at n.162.

195. Sound propagation modeling of the new GMP transformer planned for this substation was conducted and found that sound levels from the substation are below the lowest nighttime-monitored sound levels at the nearest residence, 400 feet to the north. *Id.*; *see* exh. Petitioners KHK-2.

196. In addition, the modeled sound levels are below the South Burlington Development Regulation noise standard. *Id.*; *see* exh. Petitioners KHK-2.

197. The proposed Lime Kiln substations are to be situated in an area with existing high noise levels. *Id.*

198. The substations will be located: under the flight path to the Burlington Airport; immediately adjacent to the water falls at the Gorge; be in an industrial area; and be over 1,000 feet from the nearest residence. *Id.*

199. Petitioners conducted computer sound-propagation modeling of the new transformers at VELCO's Lime Kiln substation. They modeled each transformer, assuming that they would be specified with sound emissions 10 dB below the NEMA TR-1 standard. *Id.* at 7.

200. The results show that at the nearest residences the maximum transformer sound levels would be below the lowest existing background sound level. *Id.*; *see* exh. Petitioners KHK-2.

201. Modeling results show that the substations will generate sound levels that are within established noise guidelines. *Id.*

202. In addition, Petitioners performed a noise study of the Essex X-10 transformer fan installation which demonstrates that there will be no adverse impacts with regard to noise if the new fans are installed, because the fan installation will result in decreased sound levels. Chase supp. pf. at 2–3; exh. Petitioners DC-4.

203. There will be some increase in noise as a result of project construction activities. Construction will primarily take place between the hours of 7:00 a.m. and 7:00 p.m. so as not to impact residential and commercial areas. Stamatov/Castonguay pf. at 4.

Water Pollution **[10 V.S.A. § 6086(a)(1)]**

204. The Project will not cause undue water pollution. This finding is supported by findings 205 through 260, below.

Headwaters**[10 V.S.A. § 6086(a)(1)(A)]**

205. The Project will meet all applicable health and environmental conservation regulations regarding reduction of the quality of the ground or surface waters flowing through or upon headwaters areas. This finding is supported by findings 206 through 213, below.

206. No portion of the Project area for the substations, line construction, or transmission line removal are located in areas that are considered headwaters under 10 V.S.A. § 6086(a)(1)(A). *See* exh. Petitioners DJP-2 at 18.

207. No Project facilities will be located above an elevation of 1,500 feet. *Id.*

208. Steep slopes are limited to areas where the Winooski River has cut into the relatively soft calcareous sedimentary rock and fluvial deposits, and no Project activities are proposed in these areas. *Id.*

209. A review of the public water supply watersheds (10 V.S.A. Chapter 47) and other relevant water supply information indicates that the Project will meet all applicable health and environmental conservation department regulations regarding the reduction of the quality of the ground or surface waters flowing through or upon headwaters. *Id.* at 18–19.

210. Any impacts to ground and surface waters from construction and maintenance of the proposed Project components will be minimal. *Id.* at 19.

211. The existing corridor is cleared as part of routine maintenance, and the proposed development is limited primarily to previously disturbed sites. *Id.*

212. In addition, no impacts to the Winooski River or any tributaries are anticipated. *Id.*

213. The design of the Project will incorporate measures to ensure water quality standards are met by the implementation of a project-specific erosion prevention and sediment control plan. *Id.*

Waste Disposal**[10 V.S.A. § 6086(a)(1)(B)]**

214. The Project will meet the applicable Vermont Department of Environmental Conservation ("DEC") regulations for waste disposal. It will not involve the injection of waste

materials or any harmful toxic substances into groundwater or wells. Stamatov/Castonguay pf. at 4; findings 215 through 222, below.

215. To minimize the possibility of a mineral oil release from power transformers to the underlying soil and/or groundwater, the new substation transformers will be mounted on a concrete foundation with an integral oil-retention system. Stamatov/Castonguay pf. at 4; Barrett pf. at 5.

216. The foundation and oil-retention system will be designed in accordance with ANSI/IEEE Standard 980, "IEEE Guide for Containment and Control of Oil Spills in Substations." This meets VELCO's current standard practice for environmental protection and VELCO's Spill Prevention Control and Countermeasures Plan, and is in compliance with applicable federal regulations. *Id.*; exh. Petitioners MB-7.

217. The oil containment design and plans are the same designs used and approved by the Board in connection with other recent substation upgrades. Stamatov/Castonguay pf. at 4–5.

218. Solid waste, construction debris or waste that cannot be reused or recycled will be disposed of at an approved construction and demolition debris landfill. *Id.* at 5.

219. Pole stock, arm stock, and distribution pole hardware will be removed during the removal of the 34.5 kV Waterfront Line. These materials will also be recycled, reused, or disposed of as ordinary construction/demolition waste. *Id.*

220. A sanitary facility with running water and a leach field is not proposed for the new GMP Lime Kiln or VELCO Lime Kiln substations, and no new sanitary facilities are proposed for the GMP Gorge substation. *Id.*

221. Maintenance workers will visit the Lime Kiln substations from time to time, but not of a duration or frequency to justify the need of sanitary facilities. *Id.*

222. Petitioners are investigating the feasibility of installing a small, zero-discharge, self-composting toilet unit or similar device near the Lime Kiln substations. If this is determined to be viable, then VELCO will obtain the necessary wastewater disposal permit, if applicable, prior to installation and use. *Id.*

Water Conservation**[10 V.S.A. § 6086(a)(1)(C)]**

223. There are no equipment or operational needs that require a water supply at either substation. *Id.* at 5.

Floodways**[10 V.S.A. § 6086(a)(1)(D)]**

224. The Project will not restrict or divert the flow of floodwaters or increase the peak discharge of the streams and endanger the health, safety, and welfare of the public or of riparian owners during flooding. This finding is supported by findings 225 through 227, below.

225. Based on review of the Federal Emergency Management Agency Flood Insurance Rate Map, the Project Components are not within the floodway or floodway fringe. Exh. Petitioners DJP-2 at 17, App. 1 at 15.

226. The Project has been redesigned to utilize a double retaining wall to reduce the fill footprint of the VELCO Lime Kiln substation, and the floodway and floodplain analysis demonstrated that the Project as re-designed in accordance with the Grading Plan will not infringe on the floodway or floodplain. Exh. Petitioners' GO/JC-11 (ANR MOU) at 6(a); 6(b).

227. Because the work associated with the removal of the 4.2 miles of the GMP 3323/3328 34.5 kV transmission lines is limited to only the removal of existing transmission line structures and the removal of specific circuits on existing structures that will not be modified, any potential floodway or floodway impacts will be temporary and minimal. Exh. Petitioners DJP-2 at 17.

Streams and Shorelines**[10 V.S.A. § 6086(a) (1) (E) and (F)]**

228. The Project will maintain the natural condition of involved streams and will not endanger the health, safety, or welfare of the public or adjoining landowners. The Project will, insofar as possible, retain all shorelines and waters in their natural condition, allow continued access to the waters and the recreational opportunities provided by the waters, retain or provide vegetation that will screen the Project from the waters, and stabilize the bank from erosion, as necessary, with vegetation cover. This finding is supported by findings 229 through 242, below.

229. No streams were identified within the investigation areas associated with the existing GMP Gorge substation, the proposed GMP and VELCO Lime Kiln substations, or the GMP line reconstruction Projects. Exh. Petitioners DJP-2 at 13.

230. The proposed GMP and VELCO Lime Kiln substations, GMP transmission line reconstruction, and expansion of the existing GMP Gorge substation will be located near the Winooski River. *Id.*

231. The location of the Project near the shorelines is necessary given its location within the existing right-of-way ("ROW") and the natural constraints of the peninsula. *Id.* at 20.

232. Public access to the Winooski River will be unaffected by the Project and, given the location of the site just upstream of a dam, a need for public access would be limited. *Id.*

233. Reconstructed structures will not be located on lands between the mean high-water mark and the mean low-water mark of the Winooski River. *Id.*

234. The top of the bank of the Winooski River in the vicinity of the VELCO Lime Kiln substation was delineated in accordance with ANR's riparian buffer guidance. The nearest fill is approximately 55–60 feet from the top of the bank as depicted on the Grading Plan. Approximately 10 additional feet of temporary work space may be utilized on the downslope side of the proposed retaining wall. Exh. GO/JC-11 (ANR MOU) at 6 (c).

235. This area will be restored upon completion of construction activities. *Id.*

236. Reconstructed structures will not be located on lands between the mean high-water mark and the mean low-water mark of the Winooski River. Exh. Petitioners DJP-2 at 20.

237. As required by the Vermont construction stormwater permitting program, a project-specific erosion prevention and sediment control plan will be developed to minimize any potential impacts to the river associated with construction activities. *Id.* at 14.

238. The Project crosses one unnamed perennial tributary to Lake Champlain; however, no structures are located within 150 feet of the stream. *Id.* at 15.

239. No other streams or drainages are associated with the Project. *Id.* at 14.

240. No existing structures proposed to be removed or modified during the removal of the 4.2 miles of GMP 3323/3328 34.5 kV transmission lines are located within shoreline areas. *Id.* at 21.

241. ANR will have an opportunity to comment on a revised planting plan for the design when it becomes available. ANR proposes some minor modifications to the planting schedule for the VELCO Lime Kiln substation. Specifically, Pin Oak, Staghorn Sumac, and the wildflower mix should be removed and substituted with other ANR approved alternatives. Red Oak could be substituted for Pin Oak. If the proposed wildflower mix is used, it should be screened for invasive species. VELCO has agreed to these modifications. Exh. GO/JC-11 (ANR MOU) at 6(d).

242. ANR does not have any concerns with the proposed GMP Lime Kiln substation. *Id.* at 6 (e).

Wetlands

[10 V.S.A. § 6086(a)(1)(G)]

243. The Project will not violate the rules of the Water Resources Board relating to significant wetlands. This finding is supported by findings 244 through 251, below.

244. "Class One" and "Class Two" wetlands are considered "significant" and protected by the Vermont Wetland Rules. Exh. Petitioners DJP-2 at 5.

245. No wetlands were identified at the sites of the proposed GMP and VELCO Lime Kiln substations, at the site of the expanded GMP Gorge substation, or at the transmission line reconstruction between the proposed GMP Lime Kiln substation and the existing GMP Gorge substation. Therefore, there will be no wetland impacts associated with these components of the Project. *See id.* at 8.

246. Five Class Two wetlands were identified along the GMP waterfront lines to be removed. *Id.* at 8.

247. Fourteen structures in Class Two wetlands will be removed as part of the GMP Waterfront line removal. *Id.* at 10.

248. The removal of these structures will have no undue adverse impacts on the wetlands. *Id.*

249. The Petitioners have agreed to undertake mitigation and avoidance measures at the McNeil Wetland (designated VHB 2008-1/2) to address ANR's concerns about: (1) disturbance to waterfowl and other migratory birds during line-removal activities; and (2) impacts to the wetland from access. Exh. GO/JC-11 (ANR MOU) at 4.

250. The McNeil Wetland (designated VHB 2008-1/2) is a large Class Two marsh complex that is significant for wildlife and migratory bird habitat among other functions and values. The line east of Route 127 is located in predominantly shallow emergent marsh. The line west of Route 127 goes through open-water areas. Exh. GO/JC-11 (ANR MOU) at 4.

251. The MOU between the Petitioners and ANR provides that the line-removal work can be conducted as an Allowed Use under the Wetland Rules, if GMP conducts such work subject to the following conditions (quoting from the MOU):

- a. GMP will submit a drawing of the proposed wetland access route for ANR concurrence (by the Wetlands Program of the Water Quality Division giving due consideration to equipment access constraints and safety and environmental concerns) two weeks prior to starting work in the wetlands.
- b. The sequence of timing for work within and adjacent to the Wetland designated VHB 2008-1/2 is as follows:
 - (1) Via railroad track or upland for upland poles behind the McNeil facility. ANR understands that poles in the wetland cannot be accessed from the railroad track. No timing or equipment restrictions are needed for these upland poles (Pole #'s 1, 2, 3, 4, 5A, 5B, 6A and 6B).
 - (2) All work within the wetlands will occur outside of April 1 through November 1. If feasible, work will be conducted under winter or dry conditions. When winter or dry conditions are not present or do not persist for a sufficient work period, work will be conducted using construction mats. In all cases, no observable ruts shall remain after restoration of areas of disturbance.
 - (3) Other temporary or permanent fills may require a conditional use determination or other permit authorization.
- c. All reasonable efforts will be made to use equipment that is free of invasive species, particularly Phragmites and reed canary grass. Particular care should be taken when working in and around the wetlands on the west side of Route 127, as Phragmites is abundant.
- d. A pole located in the upland of Wetland VHB 2008-3 will be accessed from the road shoulder; no specific restrictions were identified. Poles located in Wetland VHB 2008-4 will be accessed by boat between October 1 and April 1.

Id. at 4(a) – 4(d).

Water Supply**[10 V.S.A. § 6086(a)(2) and (a)(3)]**

252. The Project will not burden existing water supplies. There is no need for potable, running water at the Project substations; therefore, there are presently no plans to connect to municipal water or install domestic water supplies. Stamatov/Castonguay pf. at 6.

Soil Erosion**[10 V.S.A. § 6086(a)(4)]**

253. The Project will not cause unreasonable soil erosion or reduction of the capacity of the land to hold water so that a dangerous or unhealthy condition may result. This finding is supported by findings 254 through 260, below.

254. Because the total extent of earth disturbances associated with the Project will be in excess of one acre, Petitioners will be required to file applications for state stormwater discharge permits containing detailed Erosion Prevention Sediment Control ("EPSC") plans to be implemented during construction activities, including site-stabilization plans for the substation construction. Stamatov/Castonguay pf. at 6.

255. The Project has been redesigned to utilize a double retaining wall to reduce the fill footprint of the VELCO Lime Kiln substation. ANR MOU at 6(a); ANR MOU attachment (GMP and VELCO Lime Kiln Substation Grading Plan).

256. Petitioners will obtain and observe the terms and conditions of state stormwater discharge permits issued by ANR. Stamatov/Castonguay pf. at 7.

257. The EPSC plans will specify the types and locations of erosion control and stabilization measures that will be implemented during construction. These measures are developed consistent with the requirements set forth in the Vermont Standards and Specifications for Erosion Prevention and Sediment Control (2006). *Id.*

258. In addition, examples of standard typical erosion control measures that VELCO is likely to employ on this project include:

- Siltation fencing and hay bales;
- Culverts (repair of existing and installation of new);
- Stabilized construction entrances or mud traps;

- Water bars;
- Check dams;
- Drainage ditches; and
- Mulching/seeding and ground cover restoration.

Id.

259. VELCO reinforces its obligation to properly implement EPSCs and other types of erosion prevention through a combination of contractor-training programs focused on installation and maintenance, as well as periodic inspections by contractors working with environmental monitors. *Id.*

260. No operational (post-construction) stormwater permit will be required based on the fact that the Project does not involve the addition or redevelopment of more than one acre of impervious surface. *Id.* at 8.

Transportation Systems [10 V.S.A. § 6086(a)(5)]

261. The Project will not cause unreasonable congestion or unsafe conditions with respect to transportation systems. This finding is supported by findings 262 through 264, below.

262. The traffic and congestion attributable to construction activities will be minimal because most of the construction will occur away from major roads and state highways. Stamatov/Castonguay pf. at 8.

263. The greatest amount of construction activity is expected to occur during site preparation work (grading) at the new Lime Kiln substation site. Given the location of the work, construction activities are not expected to compromise safety or efficiency of traffic flow. *Id.*

264. The only exception may be during the delivery of large equipment (e.g., transformers, circuit breakers). If it is anticipated that equipment deliveries or construction activities will have the potential to impact public safety or traffic flow, Petitioners will provide for traffic-control personnel to manage and direct traffic during such operations. *Id.*

Educational Services**[10 V.S.A. § 6086(a)(6)]**

265. There will be no adverse impacts upon educational services in Chittenden County, as the Project will not result in an increase in the student population in the affected communities. *Id.* at 9.

266. Moreover, the Project will not impact the ability of local municipalities to provide educational services. If anything, the improvements in reliability will make it less likely that schools will experience a prolonged outage following a system contingency. *Id.*

Municipal Services**[10 V.S.A. § 6086(a)(7)]**

267. The Project will not place an unreasonable burden on the ability of the affected municipalities to provide municipal services. This finding is supported by findings 268 through 269, below.

268. Once completed, the Project will not require any additional support services from local fire departments or law enforcement officers. Some coordination with traffic enforcement services may be necessary in order to deliver equipment to the Project right-of-way or construction access areas; however, such delivery tends to occur sporadically, and only for short time periods. *Stamatov/Castonguay pf. at 9.*

269. The construction debris to be generated during construction will not compromise existing regional solid waste facilities. *Id.*

Aesthetics**[10 V.S.A. § 6086(a)(8)]**

270. The Project will not have an undue adverse effect on aesthetics or on the scenic or natural beauty of the area. This finding is supported by findings 271 through 316, below.

General Findings Regarding Aesthetics

271. Although the Project is located within a densely populated area of Vermont and certain portions of the Project have the potential to be visible, the Project upgrades will not result in significant visual change from public vantage points. Buscher pf. at 3.

272. The Project will enable the removal of GMP's transmission lines within Burlington's Waterfront, which will be an improvement to an existing visual impediment. *Id.*

273. Project upgrades in general will not have an adverse aesthetic impact to the area. Of all the areas identified to have views of the Project, only one location will experience adverse visual impacts. *Id.* at 4; exh. Petitioners MJB-2 at 10.

274. There are no locations in which the incremental upgrades from the Project would be shocking or offensive to the average person, because: (1) visibility of Project components that pose noticeable change to the visual environment is very limited; (2) Project components that are more visible typically replace existing infrastructure, and the perceived visual change of these items will be minimal; and (3) major Project components are planned for areas that are zoned for and already have an industrial character. Exh. Petitioners MJB-2 at 10–11.

275. The Project does not violate a clear, written community standard intended to preserve the aesthetics or scenic beauty of the area at which the GAR Project is located. The utilization of existing transmission corridors is encouraged within the town plans for the communities in which the corridor exists. *Id.* at 11.

276. The Petitioners have taken generally available mitigating steps to improve the harmony of the Project with its surroundings. Reasonable mitigation has been proposed throughout the Project in structure design and also with the use of landscape mitigation plantings. *Id.* at 11.

277. Taking into consideration the mitigation proposed and the overall societal benefits of the Project, we find that the Project's aesthetic impacts are not undue. Findings 271 through 276 and 278 through 317; exh. Petitioners MJB-2 at 20.

Proposed New VELCO and GMP Lime Kiln Substations

278. The new Lime Kiln substations are proposed for a site at the end of Berard Drive in South Burlington, across the Winooski River from the existing GMP Gorge substation in Colchester. Exh. Petitioners MJB-2 at 12.

279. Although the Project upgrades in this location will have adverse aesthetic impacts in this area, the impacts will not be unduly adverse. *Id.* at 16.

280. The Project area is a peninsula of land created by a sharp bend in the Winooski River which extends generally to the north. The peninsula slopes east to the Winooski River and is vegetated with young forest cover. Low-growing vegetation is maintained in the transmission corridors. *Id.* at 12.

281. To the west, the land abruptly drops into the Winooski Gorge. At the north end of the peninsula is GMP's Gorge Hydroelectric facility. An access road from Berard Drive to the hydroelectric facility runs north along the higher elevations of the peninsula. *Id.*

282. The New England Central Railroad passes just south of the hydroelectric facility with bridges both to the east and west of the peninsula. *Id.*

283. The area is zoned Commercial/Industrial. Berard Drive currently contains many industrial operations. *Id.*

284. The proposed substation site is well screened from most public views. Views do exist from near the end of Berard Drive, a lightly traveled roadway. Berard Drive is accessed from Airport Parkway, a heavily traveled road. *Id.*

285. The site is not generally visible from Airport Parkway. *Id.*

286. There are no views into the site from Lime Kiln Road or the Lime Kiln Bridge over the Winooski River. *Id.*

287. Views from the Winooski Valley Park District's ("WVPD") Gorge Area into the site are screened by a second intervening peninsula that is east of the Project and extends to the south. *Id.*

288. In Colchester GMP's hydroelectric facility is visible from the Days Inn hotel and adjacent parking area, although it is not visible directly from Route 15. Any views that might

exist would be for extremely short durations and would not be noticeable by the average person. *Id.*

289. The new VELCO and GMP Lime Kiln substations constitute the largest visual change that will occur as a result of Project upgrades. This site was chosen because of its isolated location, proximity to other project components, and the existing industrial character of the area. *Id.* at 14–15.

290. To accommodate the necessary equipment, two separate Lime Kiln substations are proposed in order to reduce the footprint and extensive grading that would have been necessary for a single large substation. Nonetheless, to place the substations at this location, excavation and re-grading will be required to create the level areas required for the two substation yards. *Id.* at 15.

291. The substations will be located east of the existing GMP hydro-electric access road, west of the Winooski River. The slope on either side of the substations will be increased to accommodate the substations. *Id.*

292. The GMP substation will be approximately 160 by 90 feet, and will utilize a retaining wall west of the substation to meet existing grades. The GMP access road will also need to be relocated slightly to the west in order to accommodate the changes in grading and provide access to both substations. *Id.*

293. The VELCO substation, located south of the transmission corridors, will be approximately 260 feet by 150 feet with the longer dimension parallel to the access road. *Id.*

294. The largest component of the VELCO substation will be the A-Frame structures that receive the incoming 115 kV lines. They will be approximately 54 feet to the top of each structure. The 115 kV lines will enter at approximately 40 feet above the base elevation of the substation yard. *Id.*

295. There will also be two structures added to the new K-23 line to direct the lines in and out of the VELCO substation. These structures will be steel H-frame structures and will be 65 feet above grade. *Id.*

296. A new 34.5 kV line to connect the VELCO and GMP substations will be constructed underground. Proposed plans also accommodate a future, second 34.5 kV line to connect the VELCO and GMP Lime Kiln substations. *Id.*

297. The new GMP substation will be constructed north of the transmission corridors. The height of the steel structure will be 30 feet tall and the lightning protection apparatus will be up to 40 feet tall. *Id.*

298. At the base of the slope east of the VELCO substation, a buffer of vegetation will be retained between the Winooski River and the limit of disturbance. The new slope will be re-vegetated and naturalized with native plantings. *Id.*

299. Petitioners have proposed landscape mitigation for the slope west of the VELCO Lime Kiln substation, which rises to the industrial facilities at the end of Berard Drive. *Id.*

300. North of the GMP substation an existing vegetative buffer will be retained between the substation and the New England Central Railroad. Existing vegetative buffers will also be retained west of the relocated access road and east of the retaining wall for the GMP substation. *Id.* at 15–16.

301. It is expected that, in general, the two new substations will not be visible. Views from surrounding areas in general will not have sight of the new substations. *Id.* at 16.

302. The substations will be visible from the Winooski River, but that visibility will be limited by a number of factors. *Id.*

303. First, the elevation of the river is almost 50 feet below the elevation of the substation yards. This difference places the substations above the general focus of people using the river. *Id.*

304. Second, the existing vegetation that will be preserved along the banks of the river will largely screen the lower portions of the substations, with the upper portions also being screened depending on the viewing location. *Id.*

305. Lastly, this portion of the Winooski River is down river from the last portage prior to the existing GMP hydro dam. The last access point is upriver from the Lime Kiln Bridge, as directed by Winooski Valley Park District's paddling guide. Canoeists and kayakers are instructed to portage boats by vehicle between the Winooski Gorge Portage at Lime Kiln Road and the

Millyard Canoe Access off West Canal Street in downtown Winooski. This limits the number of recreational users at this location. *Id.*; exh. Petitioners MJB-2, Appendix B.

306. The proposed landscape mitigation plantings will vegetate the new slope, supplement the existing vegetation, and screen the majority of the proposed substations. *Id.*

307. The Project upgrades in this location area will have adverse aesthetic impacts, but they will not be unduly adverse, on account of a number of factors:

- Views to the proposed site are limited from most public viewing locations. Public views that do exist to the site are from isolated points and for an extremely brief duration. Overall, the quality of views will decrease only slightly due to Project upgrades, most significantly from the Winooski River. These views will be partially screened by existing vegetation, and this section of the river is not readily accessible to paddlers.
- The substations are proposed for an area that is zoned for industrial/commercial uses and currently has an industrial character. Upgrades will be implemented adjacent to an existing transmission corridor where transmission infrastructure is already established as part of the landscape, including two 34.5 kV lines, an existing 115 kV line and an approved second 115 kV line. The site also contains infrastructure for the New England Central Railroad, including two bridges that span the Winooski River on either side of the peninsula.
- The location is in itself a mitigating element, compared to an alternate location off Airport Parkway originally investigated by the Petitioners. The current proposed location is considerably less visible than the Airport Parkway location would have been.
- The proposed mitigation plantings will help further screen and mitigate visibility.

Id. at 16–17.

Reconstruction and Expansion of the GMP Gorge Substation

308. The GMP Gorge Substation in Colchester is located at the end of Gorge Road, which is accessed from Route 15. This site has a long history of use for electrical transmission and generation facilities. Within the confines of the fenced area, which includes the existing substation, is also a fuel-oil-fired turbine-generator, the associated oil-storage tanks, and the remains of the original Vermont Electric Company's Gorge Hydroelectric Station, built at this location in 1893. Additionally, there is a natural-gas substation near the entrance of the GMP fenced area. *Id.* at 17.

309. The proposed Project upgrades will not have adverse aesthetic impacts in this location. *Id.* at 18.

310. The Project upgrades will result in only a small expansion to the substation, which is an existing substation where transmission infrastructure is already established as part of the landscape. The proposed structures will be of similar scale and height as existing equipment being replaced. *Id.*

311. Views of the substation facilities are limited. Views of other existing electrical generation and transmission infrastructure adjacent to the substation are possible, including from Interstate 89. The majority of the substation site will be screened by mature evergreen and deciduous vegetation, and the Project will not create new views of transmission infrastructure. Direct views of the existing and proposed substation are limited to a brief duration as vehicles pass under the corridor for the VELCO K-25 line and the GMP 3307 line, outside the typical cone of vision for travelers on the interstate. *Id.*

Reconstruction of the 3307/3308 Lines

312. The Project includes the reconductoring of approximately 700 feet of GMP's 34.5 kV 3307/3308 lines to connect the new GMP Lime Kiln substation with the GMP Gorge Substation. This section of line includes two sets of structures, one on either side of the Winooski River. *Id.*

313. The Project upgrades will not have adverse aesthetic impacts in this location. *Id.* at 19.

314. Visibility of the existing lines and structures is mostly limited to views from Interstate 89. Views of the existing infrastructure are within the context of the GMP Gorge Hydroelectric Station, the VELCO K-25 transmission line, and the New England Central Railroad Bridge. Thus, upgrades will be in an existing transmission corridor where existing transmission infrastructure is already established as part of the landscape. *Id.*

315. The most visible support structure, west of the Winooski River, is not proposed to be replaced. The structure east of the river will be replaced with structures of similar scale and height. The new structures adjacent to the Lime Kiln Substation are not visible from general public viewing locations. *Id.*

316. The new line will use non-specular conductors that will reduce visibility. *Id.*

Discussion

Section 248(b)(5) of Title 30, Vermont Statutes Annotated, requires the Board to make a finding that a proposed transmission project will not have an undue adverse effect on aesthetics. The Board has adopted the Environmental Board's analysis from the *Quechee Lakes* decision (*Quechee Lakes Corporation*, #3EW0411-EB and #3O439-EB (1986)) to guide the aesthetics analysis. As explained in the Public Service Board's Order in Docket No. 6860, this Board applies the Quechee test in Section 248 proceedings, as follows:

The Public Service Board has adopted the Environmental Board's Quechee analysis for guidance in assessing the aesthetic impacts of proposed projects under Section 248. We have previously explained the components of the Quechee analysis as follows:

In order to reach a determination as to whether the project will have an undue adverse effect on the aesthetics of the area, the Board employs the two-part test first outlined by the Vermont Environmental Board in *Quechee*, and further defined in numerous other decisions.

Pursuant to this procedure, first a determination must be made as to whether a project will have an adverse impact on aesthetics and the scenic and natural beauty. In order to find that it will have an adverse impact, a project must be out of character with its surroundings. Specific factors used in making this evaluation include the nature of the project's surroundings, the compatibility of the project's design with those surroundings, the suitability of the project's colors and materials with the immediate environment, the visibility of the project, and the impact of the project on open space.

The next step in the two-part test, once a conclusion as to the adverse effect of the project has been reached, is to determine whether the adverse effect of the project is "undue." The adverse effect is considered undue when a positive finding is reached regarding any one of the following factors:

1. Does the project violate a clear, written community standard intended to preserve the aesthetics or scenic beauty of the area?
2. Have the applicants failed to take generally available mitigating steps which a reasonable person would take to improve the harmony of the project with its surroundings?
3. Does the project offend the sensibilities of the average person? Is it offensive or shocking because it is out of character with its

surroundings or significantly diminishes the scenic qualities of the area?

Our analysis, however, does not end with the results of the Quechee test. Instead, our assessment of whether a particular project will have an "undue" adverse effect on aesthetics and scenic or natural beauty is "significantly informed by overall societal benefits of the project."

In re: Northwest Vt. Reliability Project, Docket No. 6860, Order of 1/28/05 at 79–80 (footnotes omitted). The Board has further explained that:

Criterion 8 of Act 250 does not guarantee that views of the landscape will not change. It does, however, require that as development does occur, reasonable consideration is given to the visual impacts on the neighboring landowners, the local community, and on the specific scenic resources of Vermont.

Id. at 140.

As the Board has noted in previous decisions concerning transmission upgrade projects, "Vermonters are accustomed to the presence of power lines, both distribution and transmission, in many locations." *Id.* at 82. In this case, the aesthetic impacts of the proposed Project upgrades will be relatively minor. Visibility of the Project will be limited, and the upgrades are proposed for areas in which electrical transmission and generation infrastructure is a well-established component of the visual landscape. In two of the three locations evaluated, the Project upgrades will not result in adverse aesthetic impacts. In these locations — the GMP Gorge Substation and the 3307/3308 line improvements — the Project components will replace existing electrical transmission components. In the one area with adverse aesthetic impacts — the Proposed new VELCO and GMP Lime Kiln Substations in South Burlington — reasonable and effective mitigation has been developed such that no undue adverse impact will result. Petitioners have located the substations in an area that is zoned for industrial and commercial uses and is currently industrial in nature. Moreover, the chosen location of the substations is in itself a mitigating element, compared to the originally considered location on Airport Parkway. The Petitioners have developed a landscape mitigation plan for the VELCO and GMP Lime Kiln Substations that will provide effective screening. Finally, the Project will provide an aesthetic and societal benefit in that it will improve the visual character of the Burlington Waterfront by enabling the removal of GMP's 34.5 kV waterfront lines.

Based upon the applicable law and the facts presented in this case, I conclude that the Project will not result in an undue adverse effect on aesthetics.

Rare and Irreplaceable Natural Areas
[10 V.S.A. § 6086(a)(8)]

317. The Project will not have an undue adverse effect on any rare and irreplaceable natural areas. This finding is supported by finding 318, below.

318. No rare or irreplaceable natural areas were identified within the Project area. Exh. Petitioners DJP-2 at 26.

Necessary Wildlife Habitat & Endangered Species
[10 V.S.A. § 6086(a)(8)(A)]

319. The Project will not destroy or significantly imperil necessary wildlife habitat or any endangered species. This finding is supported by findings 320 through 326, below.

320. No threatened or endangered animal species were identified or observed within the Project area during the field study for natural resources. Exh. Petitioners DJP-2 at 28.

321. The Nongame and Natural Heritage Program has not mapped any of the Project area as Deer Wintering Habitat. *Id.*

322. Three threatened or endangered plant species protected under provisions of the Vermont Endangered Species Law were identified in the Project vicinity: low bindweed; harsh sunflower; and prairie redroot. *Id.* at 25.

323. There are no proposed construction activities associated with this Project in the vicinity of harsh sunflower occurrences. *Id.* at 26.

324. A Prairie Redroot (*Ceanothus herbaceus*) community was located in 2008 on the edge of the GMP Waterfront power line ROW south of pole #02752. Exh. GO/JC-11 (ANR MOU) at 3.

325. Two other rare plants have been identified along the railroad that are annual grasses. If Project construction in this vicinity is conducted during the winter, the plants will not be adversely affected. *Id.* at 3.

326. The ANR MOU requires the following mitigating conditions:

- a. The area does not need to be resurveyed for Prairie Redroot and Plains Frostweed if there is no work or equipment required mid-span south of pole #02752 and if foot traffic is limited to the right-of-way (ROW) boundaries.
- b. If the poles are accessed off the railroad access or heavy equipment will be in the right-of-way, then GMP will need to resurvey and flag off the Prairie Redroot and Plains Frostweed (if identified during survey) and avoid any communities or individuals present. Survey work shall be performed in the late summer or early fall immediately prior to the planned construction season. At this time, it is most likely that this work will occur late in 2011. Poles will be cut at- or above-grade, or cut below grade and backfilled with weed-free soils from onsite or clean fill free of exotic plant materials.
- c. There are two other rare plants (annual grasses) along the railroad, identified on the VHB-Pioneer plans submitted in this proceeding, which are not a concern if access to the adjacent poles is from the proximate bike path.
- d. No time restriction is needed for the Class Three wetland north of the Moran Plant. This wetland is not significant for wildlife and migratory birds, so timing restrictions on work are not warranted. The two poles will be accessed from the bike path and the use of equipment within the wetlands will be limited to the greatest extent practicable.

Id. at 3(a)–3 (d).

Historic Sites

[10 V.S.A. § 6086(a)(8)]

327. The proposed Project will not have an undue adverse effect on historic resources. This finding is supported by findings 328 through 363, below.

Archaeological Resources

328. The Louis Berger Group, Inc. ("Berger") assessed the archaeological potential of the ROW and other Project components through field reconnaissance of the area of potential effect and use of the Vermont Department of Historical Preservation's ArcheoMap Information System, which is presented in Petitioners' archaeological resource assessment. Additionally, Berger developed a scope of work to provide a subsurface testing strategy to use for Phase I investigations for the archaeologically sensitive areas identified. Luhman pf. at 2–3.

329. Six areas of potential archaeological sensitivity were identified through background research and field reconnaissance along the ROW and other locations where other Project components will be located. *Id.* at 3.

330. Area 1 encompasses Waterfront Park in Burlington. Today the park is level and landscaped, but in the historic past a landscape such as Area 1 may have contained structures located along the waterfront. However, review of historical maps did not reveal evidence for such structures. Exh. Petitioners HL-2 at 60.

331. The limited nature of the proposed disturbance in Area 1 as well as the restriction of the proposed impacts to areas already disturbed by the emplacement of the existing poles should negate the need for archaeological fieldwork. *Id.*

332. Area 4 consists of small portions of relatively level ground adjacent on the east and west sides of Route 127 where it runs along the Intervale wetlands. However, upon close analysis of historical maps, it appears that these landforms are the result of modern construction to create a supporting platform for Route 127. *Id.*

333. The other four areas will require testing unless they can be avoided or matted. Areas 2 and 3 lie just south and southeast of the McNeil Substation and include small, relatively level landforms overlooking the broad wetlands of the Burlington Intervale. *Id.*

334. It is possible that these landforms are artificial and were constructed or otherwise affected as a result of the adjacent railroad's construction. However, given the topography of these landforms and their position in relation to large wetlands, testing is required. *Id.*

335. Areas 5 and 6 lie along the short section located between the Gorge Substation and Winooski Falls. These sections consist of relatively level and dry landforms surrounded by large wetlands. Given the surrounding landscape, however, it is likely that the Winooski has redistributed materials throughout this area over the millennia. *Id.*

336. Also, since these areas lie within Limerick soils, it is possible that seasonal flooding has not allowed for the development of the stable surfaces on which archaeological materials would remain intact. However, given the position of these landforms in relation to the surrounding wetlands, testing will be required if these areas cannot be avoided or matted. *Id.*

337. Berger recommends that Petitioners perform field investigations involving both surface inspections and subsurface surveys in areas that have been identified as archaeologically sensitive. Luhman pf. at 4.

338. Should any archaeological sites be identified during the Phase I subsurface survey, Berger recommends that Petitioners review project plans to determine whether the identified resource can be avoided. *Id.* at 6.

339. If avoidance is not possible, then Berger recommends additional investigation at the site examination (or Phase II) level to ascertain site boundaries with respect to the proposed activities. *Id.*

340. If it is determined that the archaeological site is eligible for the National or State Registers and that project-related impacts will occur, it is Berger's recommendation that a data recovery plan be prepared to guide any data-recovery (or Phase III) excavations that may be necessary. *Id.*

341. The scope of work, if performed in the archaeologically sensitive areas that Berger identified, ensures that the Project will not have an undue adverse effect on archaeological historic sites. *Id.* at 7.

Above Ground Historic Resources

342. The Project will not cause undue adverse effects on historic properties, provided that Petitioners follow the mitigation measures set forth in the "Historic Sites Report." Petitioners HH/MJB-2.

343. Limited development exists within view of the Project sites, and nearly all of the buildings and structures are commercial or industrial in nature. Henry/Buscher pf. at 5; exh. Petitioners HH/MJB-2 at 6.

344. There are no individual historic properties within the Project viewshed that are listed on the State Register of Historic Places. Henry/Buscher pf. at 5; exh. Petitioners HH/MJB-2 at 6.

345. There are four properties in the Project viewshed that appear to meet the criteria of eligibility but have not been listed. Henry/Buscher pf. at 5–6; exh. Petitioners HH/MJB-2 at 6.

346. The Project will not directly affect any historic properties. The Project impacts will consist solely of visual effects, which will range in degree from negligible to not adverse. Henry/Buscher pf. at 6.

347. Three historic properties eligible for the State Register exist within the viewsheds of the proposed Lime Kiln substations and reconstructed 34.5 kV sub-transmission lines in South Burlington. These form a cluster around the river gorge, where two historic railroad bridges bracket an historic hydroelectric generating station. Exh. Petitioners HH/MJB-2 at 10.

348. The New England Central Railroad Bridge, located on the Winooski River off Berard Drive (designated as historic site SB-1, and identified by the railroad as Winooski River #3 of the Winooski Subdivision), spans the river just upstream from the Gorge No. 18 Hydroelectric Station. The main span was originally erected in 1921, and the bridge was later moved in 1971–1973. *Id.* at 11.

349. The proposed VELCO Lime Kiln Substation will occupy a cleared area perpendicular to the south side of the right-of-way of the existing VELCO K-25 115kV transmission line, about 600 feet upstream (south) of the bridge. *Id.*

350. The proposed GMP Lime Kiln substation will occupy a site on the north side of the existing GMP 3307/3308 34.5 kV sub-transmission lines and the east side of the driveway leading to the Gorge No. 18 Hydroelectric Station, just south of the New England Central Railroad crossing and about 300 feet southwest of the bridge. *Id.* at 10–11.

351. Numerous deciduous trees provide foreground screening of both views, and the visual impact of the Project on the historic railroad bridge is not adverse. *Id.* at 11.

352. The active Gorge No. 18 Hydroelectric Station (historic site SB-2) includes the dam in the left channel of the Winooski River and the power house sited next to the steep left bank just downstream. *Id.* at 12.

353. The proposed GMP Lime Kiln substation will occupy a site on the north side of the right-of-way of the GMP 3307/3308 34.5kV sub-transmission lines and along the eastside of the gravel driveway leading to the hydroelectric station, about 400 feet to the northwest. *Id.* at 13.

354. Given the position of the station at river level in the steep-walled gorge, only the upper crane deck of the hydroelectric station will afford a view of the substation. Partial screening by deciduous trees will limit the impact such that it is not adverse. *Id.*

355. The New England Central Railroad Bridge, located on the Winooski River off Berard Drive (SB-3, identified by the railroad as Winooski River #2 of the Winooski Subdivision), was

erected in 1928 and spans the river just downstream from the Gorge No. 18 Hydroelectric Station. *Id.* at 13.

356. The reconstructed 34.5 kV lines will span the river gorge about 200 feet downstream (south) of the bridge. *Id.*

357. Given the quasi-industrial character of the area, the visibility of the 34.5 kV lines will not have an adverse impact on the historic railroad bridge. *Id.*

358. Adjacent to the east side of the reconstructed Gorge substation, but sited at river level below the bluff, are the remains of an abandoned hydroelectric generating station. That former industrial site constitutes the only historic property in Colchester within the viewshed of the proposed reconstructed substation and 34.5 kV lines. *Id.* at 14.

359. The hydroelectric station ruins off of Gorge Road span the right (west) channel of the Winooski River at a rocky island. *Id.* at 15.

360. The reconstructed 34.5 kV line will span the river about 400 feet south of the ruined powerhouse. The Camelback railroad bridge (SB-3) spans the river closer to the powerhouse, providing some screening. Furthermore, the 34.5 kV line relates in function to the ruined powerhouse, and the effect of the lines on the powerhouse is not adverse. *Id.* at 16.

361. Although adjacent, the reconstructed Gorge Substation will not appear visible from the ruined hydroelectric station owing to the abrupt difference in elevation. As such, the effect on the historic ruins is negligible. *Id.*

362. The Project will have an overall positive effect on historic resources in that it will enable the removal of the GMP 3323 and 3328 34.5 kV sub-transmission lines that extend 4.2 miles between the McNeil Substation in the city of Burlington and the Queen City Substation on the South Burlington border (the so-called Waterfront Lines). These lines generally follow railroad rights-of-way, but several historic properties exist within their viewsheds. *Id.*

363. The 3328 34.5 kV line passes through the Battery Street-King Street Historic District listed in the National Register of Historic Places, and, farther south, passes along one edge of the Lakeside Historic District, also listed in the National Register. The removal of the poles and conductors will have beneficial visual effects on these historic properties. *Id.*

Development Affecting Public Investments
[10 V.S.A. § 6086(a)(9)(K)]

364. The Project will not materially jeopardize or interfere with the function, efficiency, safety, or the public's use, access to, or enjoyment of public resources, facilities, services, or lands. This finding is supported by findings 365 through 367, below.

365. "[E]lectric transmission facilities" and "electric generation facilities" are included in the definition of public investment as found in Criterion 9(K) of Act 250. Stamatov/Castonguay pf. at 10.

366. Electric transmission facilities will be positively affected by the Project, and hospitals, offices, educational institutions, and municipal buildings in the area will be positively affected as a result of improved electric system reliability serving these facilities. *Id.*

367. Removal of the GMP Burlington Waterfront lines will improve the aesthetics of the Burlington waterfront and is consistent with the City's goals for redevelopment of that area. *Id.*

Least-Cost Integrated Resource Plan
[30 V.S.A. § 248(b)(6)]

368. The Project is consistent with the principles for resource selection expressed in Green Mountain Power's Integrated Resource Plan ("IRP"). *See* findings 369 through 375, below.

369. Green Mountain Power's 2007 IRP was approved in Docket No. 7319. Smith pf. at 16.

370. The analysis of the need for this Project, then referred to as East Avenue Loop - Phase II, was the subject of an area-specific collaborative for which no Board docket was ever opened. *See* Green Mountain Power 2007 IRP, Appendix F, at 178; Smith pf. at 16.

371. The Project is consistent with the IRP's focus on the provision of reliable electric service. Completion of the Project will permit continuation of reliable service for the load in the affected areas. Smith pf. at 16.

372. Green Mountain Power's 2007 IRP, Appendix F reads in pertinent part:

East Avenue Loop - Phase II

The East Avenue Loop - Phase II project is a component of the twenty-year plan for the area discussed in the Burlington Water Front ASC. Phase II will be required when reliability criteria dictate, currently projected for 2010. Phase II is made up of four components:

- Constructing a new 115 - 34.5 kilovolt substation on the west side of Airport Parkway in the existing VELCO K-25 and GMP 3307 - 3308 line corridor (Gorge VELCO substation).
-
- Upgrading the Gorge GMP substation.
-
- Removing GMP's 3323 and 3328 lines (Waterfront Lines).

Id.

373. The Project scope has changed somewhat due to the removal of the 3307 reconductoring from the Project scope and unsuccessful Airport Parkway land-acquisition negotiations. The area served by this Project has also been targeted with additional Energy Efficiency Utility funds. *Id.* at 16–17.

374. Appendix F to GMP's IRP also states generally, with respect to projects considered by area-specific collaboratives, that:

These projects could not be deferred by reducing loads with energy efficiency or serving local loads with distributed generation; therefore the five projects had no energy supply impact on GMP's IRP. The projects — whether completed, not yet in service, or on-going — did result in a more efficient and robust T&D system with less system loss. While the loss achieved by these projects was generally significant for the specific study, the savings when compared to GMP's overall supply resource needs was very small and was not specifically accounted for when determining GMP's overall need for future generation resources.

Id. at 17.

375. The Project cannot be cost-effectively supplanted or deferred by demand-side management, generation, or load response. Therefore, the Project is consistent with the principles of least-cost planning. *See Findings 368-374, above.*

Compliance with Electric Energy Plan [30 V.S.A. § 248(b)(7)]

376. The Project complies with the electric energy plan approved by the Department under 30 V.S.A. § 202. This finding is supported by findings 377 through 383, below.

377. The DPS recognizes the following in its Vermont Electric Plan dated January 19, 2005, (the "Plan"):

Modern society has come to depend on reliable electricity as an essential resource for national security, health and welfare, communications, finance, transportation, food and water supply, heating, cooling, lighting; computers and electronics; commercial enterprise; and even entertainment and leisure. In short, nearly all aspects of modern life are driven by electricity. Customers have grown to expect that electricity will almost always be available when needed at the flick of a switch. Most customers have also experienced local outages What is not expected is the occurrence of a massive outage on a calm, warm day. Widespread electrical outages, such as the one that occurred on August 14, 2003, are rare, but they can happen if multiple reliability safeguards break down. Such outages, in turn, produce considerable economic losses.

LaForest/Cecchini pf. at 19 (quoting the Plan at 7-1).

378. Drawing from the State Energy Policy, the Plan establishes as a benchmark that to the greatest extent practicable . . . Vermont can meet its energy service needs in a manner that is adequate, reliable, secure and sustainable; that assures affordability and encourages the state's economic vitality, the efficient use of energy resources and cost effective demand side management; and that is environmentally sound

Id. at 19–20 (quoting the Plan at 1-5).

379. The Plan recognizes the critical importance of an adequate and reliable transmission and distribution infrastructure as a means of handling peak demand:

To meet peak demands . . . not only must utilities secure sufficient electric supplies to meet peak demands, they must be able to distribute them to customers over the network of transmission and distribution lines that cross the state. Therefore, Vermont's poles and wires network must be large enough to handle all of the electricity demanded.

Id. at 20 (quoting the Plan at 3-6).

380. Consistent with the Plan, the Project is designed to meet expected electricity demand and to ensure sufficient energy supply to Chittenden County electric customers and to minimize potential for outages due to transmission failures. The Project represents the best option out of multiple scenarios identified to address a specific reliability concern. *Id.*

381. The Project is "efficient" in that it compares favorably to demand-side management, load response, and other potential energy efficiency solutions. *Id.*; *see generally* Grimason pf. and supp. pf. and Smith supp. pf.

382. The Project is also "efficient" in the traditional sense, because it maximizes the use of existing substation locations and utility corridors. In that regard, it is significant that the Plan directs as follows for transmission projects:

Where additional transmission capacity is required, the preferred method for increasing transmission capacity should be through the upgrading of existing facilities within existing transmission corridors.

LaForest/Cecchini pf. at 21 (quoting Plan at 8-3).

383. The Plan's goals on safety and the environment are reflective of the Section 248(b)(5) and related Act 250 criteria. *Id.*

Existing Transmission Facilities
[30 V.S.A. § 248(b)(10)]

384. The proposed Project can be served economically by existing or planned transmission facilities without undue adverse effect on Vermont utilities or customers. This finding is supported by findings 385 through 387, below.

385. The existing transmission and subtransmission network serving Chittenden County is not capable of reliably meeting Vermont's existing and future electrical needs. *See* findings 11 through 17, above.

386. The primary purpose of the proposed Project is to improve the reliability and adequacy of the existing transmission facilities serving Chittenden County. LaForest/Cecchini pf. at 20.

387. Petitioners examined both transmission and non-transmission alternatives to the Project, and the Project provides the preferred and most cost-effective solution to provide reliable and adequate electric service to Vermont and its customers. *See* findings 128 through 170, above.

IV. CONCLUSION

After an examination of the evidentiary record and analysis of the proposed findings and conclusions of law put forth by the parties in this docket, I find that the proposed transmission upgrades will promote the general good of the state, and recommend that the Project be approved, with the conditions included in the proposed Order.

This Proposal for Decision has been served on all parties to this proceeding in accordance with 3 V.S.A. § 811.

Dated at Montpelier, Vermont, this 18th day of November, 2009.

s/John P. Bentley
John P. Bentley, Esq.
Hearing Officer

V. ORDER

IT IS HEREBY ORDERED, ADJUDGED AND DECREED by the Public Service Board of the State of Vermont that:

1. The findings, conclusions and recommendation of the Hearing Officer are adopted.
2. The construction of the proposed Gorge Area Reinforcement Project ("Project") as described herein, will promote the general good of the State of Vermont, and a certificate of public good shall be issued to Vermont Electric Power Company, Inc., and Vermont Transco LLC (collectively, "VELCO") and Green Mountain Power Corporation ("GMP" and, collectively with VELCO, the "Petitioners").
3. Construction, operation, and maintenance of the Project shall be in accordance with the evidence and plans submitted in this proceeding, and the findings and requirements set forth in this Order.
4. Prior to proceeding with construction, Petitioners shall file, for the Board's approval, final construction plans for the Project, which Project plans shall conform substantially to the Project plans approved by this Order. Petitioners shall note any changes in the final plans from the plans submitted as evidence in this proceeding and any affected party shall have two weeks to comment on any such changes from the date the plans are filed.
5. Prior to proceeding with construction, Petitioners shall obtain all necessary permits and approvals. Construction, operation, and maintenance of the proposed Project shall be in accordance with such permits and approvals.
6. The Petitioners shall comply with all conditions and requirements set forth in the following agreements:
 - (a) Memorandum of Understanding dated November 25, 2008, among the Petitioners and the Vermont Agency of Natural Resources, with associated attachment, entered into evidence as Exhibit Petitioner GO/JC-11; and
 - (b) Memorandum of Understanding dated August 21, 2009, among the Petitioners and the Vermont Department of Public Service, entered into evidence as Exhibit Petitioner DLL-Supp-3.
7. The Board retains jurisdiction to review aesthetic mitigation measures post-construction and to require additional mitigation measures as the Board determines to be appropriate.

8. Petitioners shall conduct pre- and post-construction noise monitoring at all Project substations to confirm that the transformers are operating according to their specifications and file the results with the Board and affected parties. The Board shall retain jurisdiction to decide any issues associated with post-construction noise at the Project substations.

Dated at Montpelier, Vermont, this 23rd day of November, 2009.

<u>s/James Volz</u>)	
)	PUBLIC SERVICE
)	
<u>s/David C. Coen</u>)	BOARD
)	
)	OF VERMONT
<u>s/John D. Burke</u>)	

OFFICE OF THE CLERK

FILED: November 23, 2009

ATTEST: s/Susan M. Hudson
Clerk of the Board

NOTICE TO READERS: This decision is subject to revision of technical errors. Readers are requested to notify the Clerk of the Board (by e-mail, telephone, or in writing) of any apparent errors, in order that any necessary corrections may be made. (E-mail address: psb.clerk@state.vt.us)

Appeal of this decision to the Supreme Court of Vermont must be filed with the Clerk of the Board within thirty days. Appeal will not stay the effect of this Order, absent further Order by this Board or appropriate action by the Supreme Court of Vermont. Motions for reconsideration or stay, if any, must be filed with the Clerk of the Board within ten days of the date of this decision and order.